

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of Parts 2, 25, and 73 of the)	
Commission's Rules to Implement Decisions)	
from the World Radiocommunication Conference)	ET Docket No. 04-139
(Geneva, 2003) (WRC-03) Concerning Frequency)	
Bands Between 5900 kHz and 27.5 GHz and to)	
Otherwise Update the Rules in this Frequency)	
Range)	

NOTICE OF PROPOSED RULEMAKING

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By the Commission:

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I. INTRODUCTION

1. By this action, we propose to amend Parts 2, 25, and 73 of our Rules to complete the domestic implementation of allocation decisions from the World Radiocommunication Conference (Geneva, 2003) (WRC-03) concerning the frequency bands between 5900 kHz and 27.5 GHz and to otherwise update our Rules in this frequency range.¹ The following proposals are the most significant to non-Federal Government operations:

- Authorize single sideband (SSB) and digital transmissions in the frequency bands between 5900-26100 kHz that are allocated to the high-frequency broadcasting (HFBC) service, which is also known as international or shortwave broadcasting.
- Realign the allocations near 7 MHz to (1) upgrade secondary allocations for the mobile service in bands 6765-7000 kHz and 7400-8100 kHz to primary allocations for the mobile except aeronautical mobile route (R) service;² and (2) reallocate the band 7350-7400 kHz to the HFBC service.³
- Conform the provisional Little LEO feeder link allocations (uplinks at 1390-1392 MHz and downlinks at 1430-1432 MHz) to the *WRC-03 Final Acts*, that is, downgrade these allocations from primary to secondary status.
- Allocate the band 5000-5010 MHz to the radionavigation-satellite service (RNSS) and limit the use of this allocation to Earth-to-space transmissions (RNSS (Earth-to-space) or RNSS uplinks) on a primary basis for Federal and non-Federal Government use.
- Allocate the band 5010-5030 MHz to the RNSS and limit the use of this allocation to space-to-Earth transmissions (RNSS downlinks) and satellite-to-satellite transmissions (RNSS (space-to-space)) on a primary basis for Federal and non-Federal Government use.
- Replace the secondary non-Federal Government allocation to the Earth exploration-satellite service (EESS) in the band 25.25-27.5 GHz that is limited to satellite-to-satellite transmissions with the broader inter-satellite service (ISS) allocation, but maintain its secondary status.
- Upgrade the secondary non-Federal Government allocation to the EESS (space-to-Earth) in the band 25.5-27 GHz to primary status.

2. At the request of the National Telecommunications and Information Administration (NTIA), we propose the following allocation changes for Federal Government operations, which involve spectrum primarily used by the Federal Government.⁴

¹ See *ITU World Radiocommunication Conference Final Acts (Geneva, 2003) (WRC-2003 Final Acts)*. The *WRC-03 Final Acts* shall enter into force on January 1, 2005, except as specified in ITU Radio Regulation No. 59.8. See *WRC-03 Final Acts*, Article 59 at Nos. 59.7 and 59.8.

² Aeronautical mobile (R) service is defined as an aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. 47 C.F.R. § 2.1. Thus, a mobile except aeronautical mobile (R) service allocation permits all mobile service uses except for this very specialized use.

³ The 7 MHz realignment also provides an additional 100 kilohertz of global primary spectrum for the amateur service at 7100-7200 kHz. This allocation has long been implemented in the United States. Nonetheless, this action may increase spectrum efficiency. See paras. 22-31, especially para. 30.

⁴ The Commission, which is an independent agency, administers non-Federal Government spectrum and NTIA, which is an operating unit of the Department of Commerce, administers Federal Government spectrum. 47 C.F.R. § 2.105(a). NTIA also approves the spectrum needs of new systems for use by Federal departments and agencies and maintains the Federal Government Table of Frequency Allocations in its *Manual of Regulations and Procedures for Federal Radio Frequency Management (NTIA Manual)*.

- Raise the secondary radiolocation service allocation in the band 2900-3100 MHz to primary status.
- Move the space research service (SRS) (deep space) (Earth-to-space) allocation in the band 7145-7190 MHz from a footnote to the body of the Federal Government Table of Frequency Allocations (Federal Government Table) (table entry) and make explicit that this allocation has primary status.
- Upgrade the secondary SRS allocation in the band 14.8-15.35 GHz to primary status.
- Allocate the band 25.5-27 GHz to the SRS (space-to-Earth) on a primary basis.
- Allocate the band 432-438 MHz to the EESS (active) on a secondary basis for use mainly outside of the United States.

These actions would conform our Rules to the *WRC-03 Final Acts* and are expected to provide significant benefits to the American public.

II. BACKGROUND

3. In January 2001, the Commission established the World Radiocommunication Conference Advisory Committee (WRC-03 Advisory Committee) to assist it in the development of proposals for WRC-03. Consistent with the Federal Advisory Committee Act, membership in the WRC-03 Advisory Committee was open to anyone.

4. In November 2002, the Conference Preparatory Meeting (CPM) finalized a report to WRC-03.⁵ The *Report from CPM to WRC-03* represented the best information on technical, operational, and regulatory/procedural issues relevant to the WRC-03 agenda at the time of its preparation and was used as the basis for the discussions at the Conference.

5. On January 8, 2003, the WRC-03 Advisory Committee finalized its recommendations and forwarded them to the Commission for our consideration. In addition, NTIA submitted letters to the Commission containing draft proposals that had been developed by the Executive Branch agencies. By public notice, the Commission requested comment on these recommendations and draft proposals.⁶ The *U.S. Proposals for WRC-03* that resulted for this open public process made proposals for many of the items on the WRC-03 agenda to address interests of Federal and non-Federal Government entities.⁷ In addition, the United States worked with other administrations in Region 2⁸ to craft Inter-American Proposals.⁹

⁵ See *Report from CPM to WRC-03*. This document can be downloaded from the ITU web site at <http://www.itu.int/md/meetingdoc.asp?type=sitems&lang=e&parent=R00-CPM-SP-0001>.

⁶ See *Public Notice* entitled "The FCC's Advisory Committee for the 2003 World Radiocommunication Conference Approves Draft Proposals," DA 03-91, released January 15, 2003.

⁷ See *United States of America Proposals for the Work of the Conference*, plenary meeting, Document_E, dated February 9, 2003 (*U.S. Proposals for WRC-03*); *United States of America Proposals for the Work of the Conference*, plenary meeting, Agenda Item 1.16, Document 38-E, April 28, 2003.

⁸ The ITU divides the world into three geographic Regions. The United States is in Region 2, which includes North and South America. Region 1 is primarily Africa, Europe, the former Soviet Union, and the Middle East. Region 3 is primarily the remainder of Asia, Australia, and New Zealand. See 47 C.F.R. § 2.104 for the official definitions and map of the three ITU Regions.

⁹ See *Organization of American States, Inter-American Telecommunications Commission (CITEL), Inter-American Proposals for WRC-03, Parts 1, 2, and 3*, dated April 21, 2003.

6. The International Telecommunication Union (ITU), under the auspices of the United Nations, convened WRC-03 from June 9 to July 4, 2003, in Geneva, Switzerland with over 140 countries participating. WRC-2003 considered 48 conference agenda items concerning the deployment, growth and evolving use of a broad range of spectrum-based services. The allocation changes adopted by WRC-03 directly impact Federal and non-Federal Government use of the radio spectrum. The actions taken at WRC-03 were published as the *WRC-03 Final Acts* and these actions will subsequently be codified in the ITU *Radio Regulations*.¹⁰ We reflect the Table of Frequency Allocations, which is located in Article 5 of the ITU *Radio Regulations*,¹¹ in the first three columns of Section 2.106 of the Commission's Rules as the International Table of Frequency Allocations (International Table).¹²

7. Since July 4, 2003, we have taken several actions with regards to domestic implementation of the *WRC-03 Final Acts*. Specifically, we have (1) allocated the band 108-117.975 MHz to differential global positioning system (DGPS)¹³ stations for the specific purpose of transmitting DGPS information intended for aircraft navigation;¹⁴ (2) broadened the secondary land mobile-satellite service allocation in the band 14-14.5 GHz to a generic mobile-satellite service (MSS) allocation;¹⁵ (3) made numerous allocation changes in the frequency range 5150-5725 MHz, including making 255 megahertz of spectrum available for U-NII devices;¹⁶ (4) made proposals for earth stations on board vessels (ESVs);¹⁷ and (5) finalized the V-band allocations.¹⁸

¹⁰ Specifically, the *WRC-2003 Final Acts* make changes to the ITU *Radio Regulations*, Edition of 2001.

¹¹ See ITU *Radio Regulations*, Article 5 (Frequency allocations), Section IV (Table of Frequency Allocations).

¹² 47 C.F.R. § 2.106. The International Table is subdivided into the Region 1 Table (column 1), the Region 2 Table (column 2), and the Region 3 Table (column 3), and is included in the Commission's Rules for informational purposes only. The International Table is described in 47 C.F.R. § 2.104.

¹³ DGPS allows the user to correct for GPS errors and to increase the overall accuracy of the GPS receiver. With DGPS, one GPS receiver is placed at a known location and the position information from that receiver is used to calculate corrections in the position data transmitted by the satellites. This corrected information is then transmitted to other GPS receivers in the area. The resulting real-time accuracy is in the 10-meter range. Sub-meter accuracy can be obtained by using an additional DGPS and post-processing calculations in static positioning. See http://www.magellangps.com/en/support/products/faqs/faq_gps.asp.

¹⁴ *Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service*, WT Docket No. 01-289, *Report and Order and Further Notice of Proposed Rule Making*, 18 FCC Rcd 21432 (2003) (*Aviation R&O*) at para. 85. We also authorized DGPS stations to operate in the band 1559-1610 MHz.

¹⁵ *Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range*; and *Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum For Government and Non-Government Use in the Radionavigation-Satellite Service*, ET Docket No. 02-305 and RM-10331, *Report and Order*, 18 FCC Rcd 23426 (2003) (*Above 28 MHz R&O*).

¹⁶ *Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz band*, ET Docket No. 03-122, *Report and Order*, 18 FCC Rcd 24484 (2003) (*5 GHz R&O*).

¹⁷ *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, IB Docket No. 02-10, *Notice of Proposed Rule Making*, 18 FCC Rcd 25248 (2003).

¹⁸ *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and*

(continued....)

8. On January 27, 2004, NTIA, on behalf of the Executive Branch agencies, forwarded its recommendations for the national implementation of the results from WRC-03.¹⁹ On February 20, 2004, NTIA supplemented its WRC-03 Recommendations by addressing the EESS (active) at 432-438 MHz.²⁰ In this Notice of Proposed Rule Making (Omnibus NPRM), we consider all remaining allocation changes that were made at WRC-03.²¹

III. DISCUSSION

A. International Broadcast Stations

9. *Background.* International broadcast stations transmit on certain frequencies between 5900 kHz and 26100 kHz.²² These stations can be received at great distances because their signals bounce off the ionosphere and rebound to Earth, often thousands of miles from their origination. Numerous factors affect the reception of these transmissions, including the time of day, climate, and atmospheric noise, as well as co-channel and adjacent channel interference from other international broadcast stations around the world. Unlike other broadcasting services where a licensee broadcasts on the same frequency at all times, international broadcasters are assigned frequencies in several bands and vary their transmitter frequency on a seasonal basis to account for changes in propagation conditions, changing programming needs, and interference conditions. The United States participates in international frequency coordination meetings to reduce potential harmful interference to and from foreign HF broadcasts.

10. Most international broadcast stations are operated by national governments. However, HFBC programs originating in the United States are provided by both Government and privately operated stations.²³ The Commission licenses international broadcast stations to private entities under Part 73,

(...continued from previous page)

Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations, IB Docket No. 97-95, *Second Report and Order*, 18 FCC Rcd 25428 (2003) (*V-band Second R&O*).

¹⁹ See NTIA Letter from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, NTIA, United States Department of Commerce, to Edmond J. Thomas, Chief, Office of Engineering and Technology (OET), FCC, dated January 27, 2004 (NTIA WRC-03 Recommendations).

²⁰ See NTIA Letter from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, NTIA, United States Department of Commerce, to Edmond J. Thomas, Chief, OET, FCC, dated February 20, 2004.

²¹ WRC-03 allocated the band 14-14.5 GHz to the MSS (Earth-to-space) on a secondary basis throughout the world. We have recently implemented this WRC-03 allocation by broadening the non-Federal Government secondary allocation for the land mobile-satellite service (Earth-to-space) in the band 14-14.5 GHz to a MSS uplink allocation, while maintaining its secondary status. (MSS encompasses the land mobile-satellite service, the maritime mobile-satellite service, and the aeronautical mobile-satellite service (AMSS).) *Above 28 MHz R&O* at paras. 72-78. Boeing has filed a petition for rule making concerning the use of the AMSS portion of this allocation. In its WRC-03 Recommendations, NTIA requests that aircraft earth stations operating in the band 14-14.5 GHz be required to protect existing and future stations of the space research service in the band 14-14.2 GHz and of the radio astronomy service in the band 14.47-14.5 GHz. In RM-10800, the Commission is considering service rules for AMSS use of the band 14-14.5 GHz. We believe it more appropriate to consider NTIA's requested protection of incumbent services in the band 14-14.5 GHz in that proceeding and therefore, will address this request in that future allocation and service rule proceeding.

²² 47 C.F.R. § 73.701(a).

²³ All U.S. Government and government sponsored, non-military, international broadcasting has been consolidated under the Broadcasting Board of Governors (BBG). BBG's HF broadcasters are Radio Farda, Radio Free Asia, Radio Free Europe/Radio Liberty, Radio Marti, Radio Sawa, and the Voice of America. For more information, see <http://www.bbg.gov/index.cfm>.

Subpart F of its Rules.²⁴ At present, there are 27 private sector licensees that are authorized to operate 67 HFBC transmitters.²⁵ While these private sector licensees may operate on either a commercial or a non-profit basis, most operate on a non-profit basis.

11. Currently, 2930 kilohertz of spectrum in eight HF frequency bands is allocated to the broadcasting service on a primary, exclusive basis throughout the world.²⁶ These bands are listed in the first column of Table 1, below. In addition, the band 7100-7300 kHz is allocated to the broadcasting service on a primary, exclusive basis in ITU Regions 1 and 3.²⁷ Consistent with the outcome of WARC-92, the U.S. allocated effective April 1, 2007, an additional 790 kilohertz of spectrum in ten frequency bands on a primary, exclusive basis to the HFBC service (WARC-92 HFBC bands).²⁸ These bands are listed in the second column of Table 1, below. At WRC-03, certain HFBC allocations were changed as part of a realignment at 7 MHz, which is discussed in detail in the next section. For completeness, the 7 MHz realignment is included in the second, third, and fourth columns in Table 1, below, in brackets.

²⁴ 47 C.F.R. Part 73, Subpart F--International Broadcast Stations.

²⁵ See http://ftp.fcc.gov/ib/sand/neg/hf_web/stations.html.

²⁶ On the condition that harmful interference is not caused to the broadcasting service, fixed stations communicating within national borders may continue to use frequencies in the bands 9775-9900 kHz, 11650-11700 kHz, and 11975-12050 kHz. 47 C.F.R. § 2.106, footnotes 5.147 and US367.

²⁷ In Region 2, the band 7100-7300 kHz is allocated to the amateur service on a primary basis, but its use “shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3.” 47 C.F.R. § 2.106, footnote 5.142.

²⁸ At the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992) (WARC-92), an additional 790 kilohertz of spectrum in ten frequency bands (WARC-92 HFBC bands) were reallocated from the fixed and mobile services to HFBC, effective until April 1, 2007. Until that date, the WARC-92 HFBC bands are allocated to the HFBC, fixed, and mobile services on a co-primary basis. After that date, on the condition that harmful interference is not caused to HFBC, fixed stations communicating within national borders may continue to use frequencies in the WARC-92 HFBC bands. 47 C.F.R. § 2.106, footnotes 5.136, 5.143, 5.146, 5.151, and US366. See *Amendment of Parts 2, 73, 74, 80, 90, and 97 of the Commission’s Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Below 28000 kHz*, ET Docket No. 02-16, *Report and Order*, 18 FCC Rcd 3423 (2003) at paras. 11-15.

Table 1: Exclusive International HFBC Allocations

8 existing bands that are allocated exclusively to HFBC on a worldwide basis	10 WARC-92 HFBC bands, which become effective on April 1, 2007; and WRC-03 HFBC allocation changes, which are shown in brackets	Transition plan footnotes	10 bands that will be allocated exclusively to HFBC on a world-wide basis after March 29, 2009
5950-6200 kHz	5900-5950 kHz	US366	5900-6200 kHz
[7100-7300 kHz in Regions 1 and 3]	[At WRC-03, 7100-7200 kHz was reallocated to the amateur service]	[5.141C, 5.142]	[Only 7200-7300 kHz in Regions 1 and 3 after March 29, 2009]
	7300-7350 kHz	USyyy	
	[At WRC-03, 7350-7400 kHz was allocated on a worldwide basis to the HFBC on a co-primary basis with the fixed and land mobile services.]	[5.143A, 5.143B 5.143D]	[7300-7350 kHz expanded to 7300-7400 kHz]
	[At WRC-03, 7400-7450 kHz was allocated to the HFBC on a co-primary basis with the fixed and land mobile services in Regions 1 & 3]	[5.143A, 5.143B]	[7400-7450 kHz becomes an exclusive HFBC band in Regions 1 and 3 on March 29, 2009]
9500-9900 kHz	9400-9500 kHz	US366	9400-9900 kHz
11650-12050 kHz	11600-11650 & 12050-12100 kHz	US366	11600-12100 kHz
13600-13800 kHz	13570-13600 & 13800-13870 kHz	US366	13570-13870 kHz
15100-15600 kHz	15600-15800 kHz	US366	15100-15800 kHz
17550-17900 kHz	17480-17550 kHz	US366	17480-17900 kHz
	18900-19020 kHz	US366	18900-19020 kHz
21450-21850 kHz	No change.	N/A	21450-21850 kHz
25670-26100 kHz	No change.	N/A	25670-26100 kHz
2930 kilohertz allocated exclusively to HFBC throughout the world, with an additional 200 kilohertz allocated only in Regions 1 and 3	An additional 790 kilohertz is allocated exclusively to the HFBC service throughout the world on April 1, 2007, at which time the exclusive HFBC global spectrum totals 3720 kilohertz, with an additional 200 kilohertz allocated only in Regions 1 and 3		Additional 50 kilohertz allocated exclusively to HFBC on March 29, 2009, at which time the exclusive HFBC spectrum totals 3770 kilohertz, with additional 150 kilohertz allocated only in Regions 1 and 3

12. Prior to WRC-03, footnote 5.134 stated that the use of the WARC-92 HFBC bands was limited to SSB²⁹ with the characteristics specified in Appendix 11³⁰ or any other spectrum-efficient modulation techniques recommended by the ITU's Radiocommunication Sector (ITU-R). That is, traditional double sideband (DSB) transmissions were to be prohibited in the WARC-92 HFBC bands. However, the prohibition on DSB transmissions in the WARC-92 HFBC bands was removed at WRC-03. Specifically, footnote 5.134 was modified to read as follows:³¹

²⁹ DSB transmitters transmit the carrier frequency and both sidebands resulting from the modulation of the carrier by the modulating signal. Traditionally, double sideband (DSB) emissions have been used in HF broadcasting. In contrast, SSB transmission is the method of operation in which one sideband is transmitted and the other sideband is suppressed; the carrier wave may be either transmitted or suppressed. See *The New IEEE Standard Dictionary of Electrical and Electronics Terms*, Fifth Edition.

³⁰ See *WRC-03 Final Acts*, Appendix 11 (Rev.WRC-03) (System specifications for double-sideband (DSB), single-sideband (SSB) and digitally modulated emissions in the HF broadcasting service).

³¹ WRC-97 adopted Article 12 as a simple and flexible seasonal planning procedure for HFBC based on coordination. See *Final Acts of the World Radiocommunication Conference* (Geneva, 1997) (WRC-97), Article 12. See also *ITU Radio Regulations*, Article 12. (Seasonal planning of the HF bands allocated to the broadcasting service between 5900 kHz and 26100 kHz).

5.134 The use of the bands 5900-5950 kHz, 7300-7350 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz and 18900-19020 kHz by the broadcasting service as from 1 April 2007 is subject to the application of the procedure of Article 12. Administrations are urged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution 517 (Rev.WRC-03).

13. In Resolution 517, WRC-03 resolved that digitally modulated and SSB emissions must comply with the characteristics specified in relevant parts of Appendix 11.³² Also, in Resolution 517, WRC-03 resolved that whenever an administration replaces a DSB emission with an emission using digital or SSB modulation techniques, it shall ensure that the level of interference is not greater than that caused by the original DSB emission.³³

14. WRC-03 also amended Article 23 (Broadcasting Services) by revising No. 23.12 to read as follows:

Transmitting stations of the broadcasting service operating in the HF bands allocated to the broadcasting service, except the bands as referred to in No.23.6, shall meet the system specifications contained in Appendix 11.³⁴

Thus, all U.S.-licensed international broadcasters are required to meet the system specifications contained in Appendix 11 of the ITU *Radio Regulations*. Appendix 11 describes the system specifications for DSB, SSB, and digitally modulated emissions in the HFBC bands. In general, Appendix 11 establishes minimum technical standards that enhance spectrum sharing. We note, however, that our rules do not currently provide for SSB or digital operations nor do our Rules for DSB operations mirror the Appendix 11 requirements.

15. WRC-03 also invited administrations to encourage the inclusion of digital modulation capability in all new HFBC transmitters put into service after January 1, 2004.³⁵ Recently, the ITU approved the use of the Digital Radio Mondiale (DRM) standard for broadcasting use in frequency bands below 30 MHz and some international broadcasters have begun DRM transmissions.³⁶

16. At the request of the Broadcasting Board of Governors (BBG), NTIA recommends that footnote 5.134 be added to the United States Table of Frequency Allocations (U.S. Table).³⁷ In ET Docket No. 02-161, BBG stated that when the conditions of use in footnote 5.134 were first developed at

³² See *WRC-03 Final Acts*, Resolution 517 (Rev.WRC-03) (Introduction of digitally modulated and single-sideband emissions in the high-frequency bands between 5900 kHz and 26100 kHz allocated to the broadcasting services), *resolves 2*. See also *WRC-03 Final Acts*, Appendix 11 (Rev.WRC-03) (System specifications for double-sideband (DSB), single-sideband (SSB) and digitally modulated emissions in the HF broadcasting service).

³³ See *WRC-03 Final Acts*, Resolution 517 (Rev.WRC-03), *resolves 3*.

³⁴ See *WRC-03 Final Acts*, Article 23, No. 23.12. ITU Radio Regulation No. 23.6 refers to broadcasting in the Tropical Zone, which is a type of broadcasting for internal national use in countries in the tropics. While the southernmost portions of the Continental United States and Hawaii are within the Tropical Zone, the Commission has not implemented this limited service.

³⁵ See *WRC-03 Final Acts*, Resolution 517.

³⁶ See Draft New Recommendation ITU-R BS.[Doc.6/379], document 6/BL/3-E, dated August 21, 2003. The DRM standard is more precisely IEC Standard 62272-1, which is available in electronic form at ITU website: http://www.itu.int/md/choice_md.asp?id=R00-WP6E-C-0284!P1!ZIP-E&lang=e&type=sitems.

³⁷ 47 C.F.R. § 2.106. The U.S. Table is described in 47 C.F.R. § 2.105.

WARC-92, the notion of making these frequency bands available only for SSB use was provisionally acceptable if periodic surveys indicated appropriate SSB receiver availability.³⁸ By WRC-97, BBG stated that it became obvious that digital radio development would eclipse SSB in terms of efficient use of HFBC spectrum. WRC-97 therefore modified footnote 5.134 to include digital types of modulation in addition to SSB, but DSB use was still restricted. Prior to WRC-03, BBG stated that international broadcasters still had not adopted SSB techniques and an ITU report demonstrated extremely limited availability of SSB receivers. Consequently, because of the continued reliance on DSB, the BBG actively sought the flexibility to use DSB in the WARC-92 HFBC bands as part of the United States' preparation for WRC-03. Finally, BBG stated that only when footnote 5.134 is modified to include DSB use in the WARC-92 bands will it satisfactorily meet the needs of international broadcasters, and only then should it be implemented.

17. *Proposal.* As indicated above, prior to WRC-03, footnote 5.134 had prohibited traditional DSB transmissions in the WARC-92 HFBC bands. WRC-03 modified footnote 5.134 to be more flexible to meet the needs of international broadcasters in that it permits the continued use of DSB transmissions as well as SSB in the WARC-92 HFBC bands as HF broadcasters transition to digital technology. Accordingly, we propose to add modified footnote 5.134 to the U.S. Table. Similar to the requirements in all other HFBC bands, this action would require the use of seasonal planning for the WARC-92 HFBC bands, which is codified in Article 12 of the ITU *Radio Regulations*.

18. Modified footnote 5.134 urges use of the WARC-92 HFBC bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of revised Resolution 517. To ensure that HF broadcasters have sufficient flexibility, we therefore propose to update the Commission's Rules for international broadcast stations, which are codified in Part 73, Subpart F, to allow for SSB and digital transmissions in the HFBC bands.³⁹ Specifically, so that there is no ambiguity regarding the rules with which HF broadcasters must comply, we propose to add to our rules the ITU requirements for DSB, SSB, and digital HFBC systems, which are listed in revised Appendix 11 of the ITU *Radio Regulations*. The specific language of our proposal is presented in Appendix A, Section 73.756.

19. The effect of these proposals would be to grant U.S.-licensed international broadcast stations the flexibility to continue to transmit analog DSB signals or to transmit SSB or digital signals, including DRM signals (currently the only ITU-recommended digital standard for use in HFBC bands), which would allow international broadcast stations to provide FM-like sound quality to listeners in foreign countries. Nonetheless, we request comment on whether the DRM standard should be required for digital transmissions. We observe that broadcasting, unlike many other radiocommunication services, is a mass media service and that for such a service, standards are often useful.

20. Currently, Section 73.751 of the Commission's Rules states that no international broadcast station will be authorized to install, or be licensed for operation of, transmitter equipment with a rated carrier power of less than 50 kilowatts (kW).⁴⁰ The technical basis of this rule is that, given frequency congestion, an international broadcast station using DSB modulation needs to transmit with an output power of at least 50 kW in order to provide a signal that is strong enough to be received with low cost HFBC radios. We have previously waived this Rule in order to authorize licensees to operate SSB transmitters with 50 kW peak envelope power (PEP) because this power provides approximately the same

³⁸ See letter from John O. Wood, BBG IRAC Representative, to Bruce A. Franca, Acting Chief, Office of Engineering and Technology, FCC, dated November 30, 2001, in ET Docket No. 02-161.

³⁹ 47 C.F.R. Part 73, Subpart F (International Broadcast Stations).

⁴⁰ 47 C.F.R. § 73.751 (Operating power).

coverage area (even though this power is equivalent to only 15-20 kW relative to a DSB transmitter). Likewise, one of the advantages of digital transmission is that a lower rated transmitter output power can serve the same geographic area as a higher power analog signal. One expert from a transmitter manufacturer has averred that an average power of 20 kW for DRM transmissions would provide approximately the same coverage as our Rule currently requires. Accordingly, we propose to revise Section 73.751 to codify these minimum operating powers for SSB and digital systems. See Appendix A for the proposed language for revised Section 73.751.

21. We request comment on all of the above proposals. In addition, we request comment on other needed changes to our Rules for international broadcast stations that are in compliance with ITU or other international standards. In particular, we ask whether our Rules should require the inclusion of the capability to offer digital modulation in all new HFBC transmitters put into service after the effective date of the Report and Order in this proceeding.

B. 7 MHz Realignment

22. *Background.* The band 7000-7100 kHz is allocated to the amateur and amateur-satellite services on a primary, exclusive basis throughout the world.⁴¹ Further, the band 7100-7300 kHz is allocated to the amateur service on a primary, exclusive basis in Region 2, including the United States. Prior to WRC-03, the band 7100-7300 kHz was allocated exclusively to the HFBC service in Regions 1 and 3. Thus, for the amateur service, the usefulness of allocations around 7 MHz for worldwide links was limited because only 100 kilohertz of spectrum (7000-7100 kHz) was common to Regions 1, 2, and 3. In addition, because HF broadcasters are permitted to use much higher power than amateur radio operators, HFBC transmissions originating in Regions 1 and 3 could cause interference to the sensitive receivers used in the amateur service during periods of good propagation between those Regions and Region 2.⁴²

23. At WRC-03, the worldwide amateur service allocation was expanded by 100 kilohertz by reallocating the band 7100-7200 kHz from the HFBC service in Regions 1 and 3 to the amateur service on a primary basis. However, until March 29, 2009, the band 7100-7200 kHz remains allocated to the HFBC service on a primary basis in Regions 1 and 3.⁴³ Moreover, until that date, amateur use of the band 7100-7200 MHz in Region 2 must not impose constraints on the HFBC service in Regions 1 and 3.⁴⁴

24. Also at WRC-03, the worldwide HFBC service allocation was expanded by 50 kilohertz by reallocating the band 7350-7400 kHz from the fixed and land mobile services to the HFBC service on a primary basis. However, until March 29, 2009, the band 7350-7400 kHz remains allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis throughout the world.⁴⁵

⁴¹ The amateur service is a radiocommunication service for the purposes of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. 47 C.F.R. § 2.1 (Definitions). The amateur radio service is regulated under Part 97 of the Commission's Rules. 47 C.F.R. Part 97.

⁴² The operating power for international broadcast stations must be at least 50 kW (carrier power). 47 C.F.R. § 73.751. Worldwide, most international broadcast stations transmit at least 100 kW, and there are a significant number of stations that transmit at 500 kW. In contrast, amateur stations are limited to 1.5 kW PEP, except that in certain frequency bands, amateur stations are more limited in power. For example, amateur stations are limited to 200 W PEP in the segment 7100-7150 MHz and in the segment 7050-7075 kHz, when the station is within ITU Regions 1 and 3. 47 C.F.R. § 97.313.

⁴³ Appendix A, footnote 5.141C.

⁴⁴ Appendix A, footnote 5.142.

⁴⁵ Appendix A, footnotes 5.143A, 5.143B, and 5.143D.

With regard to Region 2, the transition plan for these services is codified in footnote 5.143D, which would permit fixed and land mobile services to continue communicating within the United States and its insular areas after March 29, 2009, on the condition that harmful interference is not caused to HFBC.⁴⁶

25. WRC-03 also upgraded the secondary land mobile service allocations in the bands 6765-7000 kHz (footnote 5.138A) and 7400-8100 kHz (footnote 5.143E) to primary mobile except aeronautical mobile (R) service allocations, effective March 29, 2009. These generic mobile allocations, in conjunction with the existing primary fixed service allocations in these bands, will allow greater flexibility and also facilitate the use of frequency adaptive techniques,⁴⁷ thereby leading to greater efficiency in the use of the spectrum.

26. *Proposal.* We generally propose to implement the WRC-03 realignment at 7 MHz. However, in some cases we propose exceptions. First, we propose to upgrade the secondary mobile service allocation in the bands 6765-7000 kHz and 7400-8100 kHz to primary allocations for the mobile except aeronautical mobile (R) service. This action would give licensees increased flexibility and would facilitate adaptive techniques, which together with automation techniques, would reduce the burden on the operator while making these mobile service radios more responsive to changing HF propagation conditions. However, because the band 6765-7000 kHz is allocated to the broader mobile service in the United States (rather than the land mobile service), we propose to adopt new United States footnote USxxx that maintains this secondary mobile service allocation until the end of the transition period, and that otherwise parallels footnote 5.138A. Specifically, proposed footnote USxxx would read as follows:

USxxx Until 29 March 2009, the band 6765-7000 kHz is allocated to the fixed service on a primary basis and to the mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis.

27. At the request of NTIA, we propose to upgrade the secondary mobile service allocation in the band 7400-8100 kHz to a primary mobile except aeronautical mobile (R) service allocation, upon the effective date of the Report and Order in this proceeding.⁴⁸ We note that many of the existing licenses in

⁴⁶ Footnote 5.143D reads as follows: In Region 2, the band 7350-7400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations.

⁴⁷ Automatic and adaptive techniques have improved HF communications. In manual operation, the operator must adjust the parameters of the system for maximum performance. The operator must monitor the conditions of the ionosphere, track the variable propagation conditions, and select the frequency that will allow the signal to propagate best. Because of the intensive labor required, HF communication was a prime candidate for use of automation and adaptive techniques. Present-day automation techniques reduce the burden on the HF operator by providing subsystems for frequency management, link establishment, link maintenance, *etc.* Typically, automation can be added to make the radio appear to be “push-to-talk on the best channel,” while actually the radio is a multichannel communication device performing many underlying functions. Beyond these automation techniques are the “adaptive” techniques, which also can reduce the burden on the operator while making the radio more responsive to changing HF radio propagation conditions. Thus, these techniques provide adaptivity that automatically alters operating parameters and/or system configuration in response to changes in the time-varying channel propagation conditions and external noise. *See* <http://www.its.bldrdoc.gov/pub/oa-rpt/hf-ale/handbook/chapter2.pdf>.

⁴⁸ In contrast, WRC-03 adopted the following schedule for upgrading the secondary land mobile service allocation to a primary mobile except aeronautical mobile (route) service allocation in the band 7400-8100 kHz. For the sub-band 7400-7450 kHz, the upgrade is effective January 1, 2005 in Region 2. For the sub-band 7450-8100 kHz, the upgrade is effective March 29, 2009 throughout the world (footnote 5.143E).

the band 7400-8100 kHz are for mobile service use and request comment on the effect of the proposed early upgrade on fixed service users, if any.⁴⁹

28. Second, we propose to allocate the band 7350-7400 kHz to the broadcasting service on a primary basis; to adopt the Region 2 transition plan for the band 7350-7400 kHz as shown in footnote 5.143D; and to delete the table entries for the fixed and mobile service allocations from the band 7300-7400 kHz. Our proposal herein would provide international broadcasters with an additional 50 kilohertz of primary, exclusive spectrum in the band 7350-7400 kHz, effective March 29, 2009. While the band 7300-7350 MHz has previously been reallocated to the broadcasting service on a primary, exclusive basis, effective April 1, 2007, the table entries for the fixed and mobile service allocations were maintained at NTIA's request. As a consequence of our proposal to delete the table entries for the fixed and mobile service allocations from the band 7300-7350 kHz, we propose to provide for these allocations in a new United States footnote (USyyy) and to remove the frequency band from footnote US366. Specifically, we propose to revise footnote US366 and to add new footnote USyyy to read as follows:

US366 On April 1, 2007, the bands 5900-5950 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz, and 18900-19020 kHz shall be allocated exclusively to the broadcasting service. After April 1, 2007, frequencies in these bands may be used by stations in the fixed and mobile services, communicating only within the United States and its insular areas, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies for fixed and mobile services, licensees shall be limited to the minimum power needed to achieve communications and shall take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU Radio Regulations.

USyyy The band 7300-7350 kHz is allocated, until April 1, 2007, to the fixed service on a primary basis and to the mobile service on a secondary basis. After April 1, 2007, frequencies in that band may be used by stations in the fixed and mobile services, communicating only within the United States and its insular areas, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies for fixed and mobile services, licensees shall be limited to the minimum power needed to achieve communications and shall take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU Radio Regulations.

29. We also propose to cease issuing licenses for new non-Federal Government stations in the fixed and mobile services in the band 7350-7400 kHz as of March 29, 2009, consistent with the proposed allocation changes for these services. We anticipate that these requirements can be met in other HF bands allocated to the fixed and mobile services.

30. The band 7100-7300 kHz is allocated to the amateur service on primary, exclusive basis in Region 2. We note that WRC-03 allocated the band 7100-7200 kHz to the amateur service in Regions 1 and 3 on a co-primary basis with the broadcasting service, effective January 1, 2005. After March 29, 2009, the band 7100-7200 kHz is allocated to the amateur service on an exclusive basis throughout the world, except in certain Region 1 and 3 countries.⁵⁰ As such, amateur service use of this 100 kilohertz will be on a *de facto* secondary basis in Regions 1 and 3 until the broadcasting service vacates the band

⁴⁹ On January 15, 2004, FCC staff reviewed non-Federal Government use of the band 7400-8100 kHz using the Universal Licensing System (ULS). At that time, there were 668 licenses: 403 conventional Public Safety Pool (PW), 116 conventional Industrial/Business Pool (IG), 111 Alaska Group (MK), 27 Coastal Group (MC), and 11 Aviation Auxiliary Group (AF).

⁵⁰ The band 7100-7200 kHz will remain allocated to the fixed and mobile except aeronautical mobile (route) service on a co-primary basis with the amateur service in the countries listed in footnote 5.141B.

7100-7200 kHz at the conclusion of Schedule B in 2009.⁵¹ This means that amateur stations in Regions 1 and 3 will shortly be permitted to transmit in the band 7100-7200 kHz, if they can find a frequency that is not being used by an international broadcast station. Currently, amateur stations in Regions 1 and 3 use the segment 7075-7100 kHz for phone emissions. The Commission authorizes amateur stations to transmit phone emissions in the segment 7150-7300 kHz. Together, these segments are used by amateur stations for full duplex operations when communicating between Region 2 countries and Regions 1 and 3 countries.⁵² We anticipate that administrations in Regions 1 and 3 will in the near future authorize phone emissions in the segment 7150-7200 kHz, and we note the ARRL has requested that the frequency segment for phone emissions be expanded to 7125-7300 kHz.⁵³ These changes, if implemented, would permit half duplex operations, that is, amateur stations would be able to transmit and receive on a single frequency. If this occurs, spectrum efficiency would be increased.

31. Until administrations in Regions 1 and 3 implement changes allowing amateur stations to transmit in the band 7100-7200 kHz, we believe that Sections 97.301 and 97.305 of our Rules need not be updated.⁵⁴ As a practical matter, we do not believe that the amateur service can make use of the band 7100-7200 kHz in Regions 1 and 3 in advance of HFBC stations vacating the band because of the great power disparity between amateur stations and international broadcast stations. Table 2, below, summarizes the 7 MHz realignment and our proposals for domestic implementation. We request comment on these proposals.

⁵¹ Schedule B is the last Sunday in October to the last Sunday in March. (Schedule A is the last Sunday in March to the last Sunday in October.) See ITU *Radio Regulations*, Article 12 (Seasonal planning in the HF bands allocated to the broadcasting service between 5900 kHz and 26100 kHz), Nos. 12.17 and 12.18.

⁵² 47 C.F.R. § 97.305 (Authorized emission types), in particular paragraph (c).

⁵³ See American Radio Relay League, Inc., Petition for Rulemaking (filed Mar. 22, 2002) at 25. The ARRL's petition will be addressed in another proceeding.

⁵⁴ Section 97.301 of our Rules authorizes frequency bands to amateur stations located within 50 km of the Earth's surface, within the specified ITU Region, and outside any area where the amateur service is regulated by any authority other than the FCC. 47 C.F.R. § 97.301 (Authorized frequency bands). Section 97.305 of our Rules currently authorizes RTTY and data emissions in the segment 7000-7150 kHz and phone and image emissions in the segments 7075-7100 kHz and 7150-7300 kHz. 47 C.F.R. § 97.305(c). The Commission does not regulate communications at any location in Region 1, except for amateur stations located on ships on the high seas. In Region 3, the Commission regulates amateur stations located on Guam, the Northern Mariana Islands, American Samoa, and other smaller insular areas, in addition to stations on the high seas. 47 C.F.R. § 2.106(a).

Table 2: Realignment in the Frequency Range 6765-8100 kHz (Some international footnotes that do not apply to Region 2 are not shown)

Band (kHz)	International Allocations Prior to WRC-03	Existing U.S. Allocations	International Allocations as Revised at WRC-03	Proposed U.S. Allocations	Remarks
6765-7000	FIXED Land mobile 5.138 (6765-6795 kHz is designated for ISM applications)	FIXED Mobile 5.138 US340 (2-30 MHz is available on a non-interference basis (NIB) for measuring reception quality)	FIXED MOBILE except aeronautical mobile (R) 5.138A (This allocation does not become effective until March 29, 2009; until then, the more limited secondary land mobile service allocation remains in effect) 5.138	FIXED MOBILE except aeronautical mobile (R) 5.138 US340 USxxx (parallels 5.138A, except that mobile service, not land mobile service, is maintained until phase-in date)	Effective March 29, 2009, upgrade the secondary mobile service in 235 kilohertz to primary mobile except aeronautical mobile (R) service
7000-7100	AMATEUR AMATEUR-SATELLITE	AMATEUR AMATEUR-SATELLITE US340	AMATEUR AMATEUR-SATELLITE	AMATEUR AMATEUR-SATELLITE US340	No change.
7100-7300	7100-7300 <i>In Region 2:</i> AMATEUR 5.142 (Amateur use of 7100-7300 kHz in Region 2 must not impose constraints on Regions 1 & 3 HFBC) ----- <i>In Regions 1 & 3:</i> BROADCASTING	AMATEUR 5.142 US340	7100-7200 AMATEUR 5.142 (Until March 29, 2009, amateur use of 7100-7300 kHz in Region 2 must not impose constraints on Regions 1 & 3 HFBC. After that date, amateur use of 7200-7300 kHz in Region 2 shall not impose constraints on Regions 1 & 3 HFBC) 5.141C (In Regions 1 & 3, this band is allocated to broadcasting on a primary basis until March 29, 2009) 7200-7300 kHz <i>In Region 2:</i> AMATEUR 5.142 ----- <i>In Regions 1 & 3:</i> BROADCASTING	AMATEUR 5.142 US340	No change.
7300-7350	BROADCASTING 5.134 (The use of the HFBC bands, including the band 7300-7350 kHz, is limited to single-sideband or digital emissions) 5.143 (Until 1 April 2007, 7300-7350 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. Afterwards, fixed and land mobile use is on an NIB basis to broadcasting)	BROADCASTING FIXED Mobile US340 US366 (On April 1, 2007, the WARC-92 HFBC bands are allocated exclusively to HFBC. Afterwards, fixed & mobile use must not cause harmful interference to HFBC)	7300-7400 kHz: BROADCASTING 5.134 (Administrations are urged to use the HFBC bands to facilitate the introduction of digitally modulated emissions.) 5.143 5.143A & 5.143B (In Regions 1 & 3, 7350-7400 kHz is allocated, until March 29, 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis) 5.143D (In Region 2, 7350-7400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis & to the land mobile service on a secondary basis. After that date, fixed & mobile use must not cause harmful interference to HFBC.	7300-7400 kHz: BROADCASTING 5.134 5.143D US340 USyyy	Immediately allocate the band 7350-7400 kHz to HFBC, but until March 29, 2009, this 50 kilohertz will remain available for primary fixed & secondary land mobile use. Continued fixed & land mobile use within the U.S. and its insular areas will be permitted on an NIB basis to HFBC.
7350-8100	FIXED Land mobile	FIXED Mobile US340	7400-7450 kHz: <i>In Region 2:</i> FIXED and MOBILE except aeronautical mobile (R) ----- <i>In Regions 1 & 3:</i> BROADCASTING 7450-8100 FIXED MOBILE except aeronautical mobile (R) 5.143E (Does not become effective until March 29, 2009; until then the more limited secondary land mobile service allocation remains in effect)	7400-8100 kHz: FIXED MOBILE except aeronautical mobile (R) US340	In 700 kilohertz, immediate upgrade from secondary mobile service allocation to primary mobile except aeronautical mobile (R) service.

C. Space Radiocommunication Services

32. In the following paragraphs, we discuss proposals for several of the space radiocommunication services, which are defined as any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.⁵⁵ These proposals include:

- SRS uplinks in the band 7145-7235 MHz; and wideband SRS downlinks in the bands 14.8-15.35 GHz and 25.5-27 GHz. The SRS is a radiocommunication service in which spacecraft or other objects in space are used for scientific purposes.⁵⁶
- EESS downlinks in the band 25.5-27 GHz. The EESS is a radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which: (1) information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on Earth satellites; (2) similar information is collected from airborne or Earth-based platforms; (3) such information may be distributed to earth stations in the system concerned; and (4) platform interrogation may be included. This service may include feeder links necessary for its operation.⁵⁷
- ISS use of the band 25.25-27.5 GHz. The ISS is a radiocommunication service providing links between artificial satellites.⁵⁸

Table 3, which is at the end of this section, gives an overview of our proposals for these space radiocommunication services.

1. SRS Uplinks at 7145-7235 MHz

33. *Background.* The band 7125-7235 MHz is allocated to the fixed and mobile services on a co-primary basis throughout the world. Prior to WRC-03, the band 7145-7235 MHz was also allocated for SRS uplinks on a primary basis by footnote 5.460, which restricted the segment 7145-7190 MHz to deep space use and prohibited deep space communications in the segment 7190-7235 MHz.⁵⁹ Passive microwave sensor measurements may be carried out in the band 7125-7235 MHz.⁶⁰

34. In the United States, the band 7125-7235 MHz is primarily used by the Federal Government and is allocated to the fixed service on a primary basis.⁶¹ The sub-band 7125-7155 MHz is also allocated to the space operation service (Earth-to-space) for Federal Government use at no more than two sites;⁶²

⁵⁵ 47 C.F.R. § 2.1.

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ 47 C.F.R. § 2.106, footnote 5.460.

⁶⁰ Footnote 5.458 also states that administrations should bear in mind the needs of the EESS (passive) and the SRS (passive) in their future planning of the band 7125-7250 MHz. 47 C.F.R. § 2.106, footnote 5.458.

⁶¹ The band 7125-7235 MHz is part of a larger band that extends up to 8500 MHz, which is used for fixed point-to-point microwave links associated with many Federal agencies' missions including the DOD's national and military test range communications, and the "remoting" of data for such functions as air traffic control radar, weather, vessel traffic information, power management, *etc.* See Federal Long-Range Spectrum Plan, Plan for Federal Use of the Radio Frequency Spectrum from 1300 to 10,000 MHz at <http://www.ntia.doc.gov/osmhome/LRSP/LRSP5b.htm>.

⁶² 47 C.F.R. § 2.106, footnote G116. The space operation service is a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand.

(continued....)

and the sub-band 7190-7235 MHz is allocated to the SRS (Earth-to-space) on a primary basis for Federal Government use. In addition, Federal and non-Federal Government entities may carry out passive microwave measurements in the band 7125-7235 MHz.⁶³ The sub-band 7145-7190 MHz is also allocated for Federal and non-Federal Government SRS uplink use at NASA's deep space facility in Goldstone, California by footnote US252.⁶⁴ Staff review of the Commission's licensing database does not show any activity with regard to the band 7145-7190 MHz, that is, it appears that this spectrum has not been used by any non-Federal Government entity.

35. At WRC-03, the SRS uplink allocation in the band 7145-7235 MHz, which had been in footnote 5.460, was moved up as a table entry.⁶⁵ Footnote 5.460 was revised to delete the SRS allocation and to state that geostationary SRS satellites operating in the band 7190-7235 MHz may not claim protection from existing and future stations of the fixed and mobile services.⁶⁶

36. The United States had requested these changes at WRC-03 in order to incorporate as a table entry in the ITU Table of Frequency Allocations the existing primary SRS allocation in the band 7145-7235 MHz in footnote 5.460.⁶⁷ This uplink allocation is used with the primary SRS downlink allocation in the band 8400-8500 MHz, which is already shown as a table entry. These bands are used on a worldwide basis for "cross support" in accordance with international agreements between a number of space agencies.⁶⁸

37. NTIA recommends that the WRC-03 allocation changes in the 7 GHz frequency range be implemented in the U.S. Table, except that the limitation to deep space communications be shown as part of the table entry for the SRS uplink allocation in the band 7145-7190 MHz, that is, the allocation read as follows: "SPACE RESEARCH (deep space) (Earth-to-space)." Because this table entry would contain part of the information from footnote 5.460, NTIA requests that the pertinent part of the international footnote be retained as a Federal Government footnote (Gyyy). Furthermore, because the band

(...continued from previous page)

Note: These functions will normally be provided within the service in which the space station is operating.

47 C.F.R. § 2.1.

⁶³ That is, international footnote 5.458, which is described in paragraph 33 above, has been adopted domestically. NASA participates in remote microwave scanning measurements made over oceans for oceanographic studies/research. See Federal Long-Range Spectrum Plan.

⁶⁴ 47 C.F.R. § 2.106, footnote US252.

⁶⁵ Prior to WRC-03, the international allocations extended from 7075-7250 MHz. In order to allocate just a segment of the band 7075-7250 MHz to the SRS, this larger band was subdivided into the bands 7075-7145 MHz, 7145-7235 MHz, and 7235-7250 MHz.

⁶⁶ Modified footnote 5.460 reads as follows: "The use of the band 7145-7190 MHz by the space research service (Earth-to-space) is restricted to deep space; no emissions to deep space shall be effected in the band 7190-7235 MHz. Geostationary satellites in the space research service operating in the band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply." ITU Radio Regulation No. 5.43A states that if a service may operate in a specific frequency band subject to not claiming protection from another service, this means also that the service shall not cause harmful interference to the other service.

⁶⁷ See *U.S. Proposals for WRC-03*, Proposal B (Agenda Item 1.12) at page 50-51.

⁶⁸ Cross support means that space agencies share resources. For example, there are orbits in which a satellite is not visible from a space agency's own earth stations, but which are visible to another agency's earth stations. By sharing resources, space agencies do not have to store data onboard the satellite, and instead have immediate access to the data. See e.g. <http://projects.osd.noaa.gov/IJPS/communication.htm>.

7145-7190 MHz is primarily a Federal Government band and because there are no known non-Federal Government requirements for deep space communications, NTIA did not recommend a table entry for non-Federal Government access to the NASA deep space facility at Goldstone. NTIA states that NASA's deep space facility at Goldstone has never been leased by a non-Federal Government licensee for deep space communications, and that non-Federal Government entities have not identified any requirements at Goldstone. Therefore, NTIA submits that non-Federal Government access to Goldstone should be downgraded to secondary status and be maintained as a footnote allocation. Accordingly, NTIA recommends that footnotes US252 and US262 be revised and that a new Federal Government footnote (Gyyy) be added to read as follows:

US252 The band 2110-2120 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a primary basis at Goldstone, California.⁶⁹

US262 The band 7145-7190 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a secondary basis for non-Federal Government use. The use of the bands 7145-7190 MHz and 34.2-34.7 GHz by the space research service (deep space) (Earth-to-space) and of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) is limited to Goldstone, California.

Gyyy No emissions to deep space shall be effected in the band 7190-7235 MHz. Geostationary satellites in the space research service operating in the band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply.

38. *Proposal.* At the request of NTIA, we propose to move the SRS uplink allocation currently authorized in footnote US252 to a table entry in the Federal Government Table for the band 7145-7190 MHz.⁷⁰ NTIA prefers to highlight that SRS uplinks in the band 7145-7190 MHz are for deep space communications and does not believe that footnote 5.460 adequately highlights this important use. We believe our proposal would adequately clarify that the band 7145-7190 MHz is allocated to the SRS (deep space) (Earth-to-space) on a primary basis for Federal Government use. NTIA states that Federal Government SRS operations should be limited by adopting the remaining requirements in footnote 5.460 as footnote Gyyy. Accordingly, we propose to adopt footnote Gyyy, which would prohibit deep space communications in the band 7190-7235 MHz and which would specifically not require that stations in the fixed and mobile services protect geostationary SRS satellites. We believe that these actions are fully in accordance with the ITU *Radio Regulations*.

39. With regard to the requested change in the allocation status for non-Federal Government SRS use of the Federal facility at Goldstone, we view this downgrade as having a minimal impact on future non-Federal Government users of the facility. That is, NTIA has coordinated the deep space facility at Goldstone in order to avoid interference problems with other Federal Government stations. Therefore any non-Federal Government SRS use, if it ever develops, should be coincidentally protected. We request comment on these proposals.

2. SRS at 14.8-15.35 GHz

40. *Background.* The band 14.8-15.35 GHz is allocated to the fixed and mobile services on a co-primary basis and to the SRS on a secondary basis throughout the world. The sub-band

⁶⁹ Currently, footnote US252 applies to both the 2110-2120 MHz and 7145-7190 MHz. As a consequence of NTIA's recommendation to move the SRS uplink allocation for deep space communications in the band 7145-7190 MHz to footnote US262, footnote US252 would apply only to the band 2110-2120 MHz.

⁷⁰ In order to implement this proposal, we would subdivide the existing band 7125-7190 MHz in the Federal Government Table into the bands 7125-7145 MHz and 7145-7190 MHz.

15.2-15.35 GHz is also allocated to the SRS (passive) and EESS (passive) on a secondary basis throughout the world.⁷¹

41. In the United States, the band 14.8-15.35 GHz is primarily allocated for Federal Government operations with only limited non-Federal Government use authorized through footnote allocations. In the Federal Government Table, the band 14.8-15.35 GHz is allocated in accordance with the international allocations described in the preceding paragraph, except that the segment 14.8-15.1365 MHz is allocated to the fixed service on a secondary basis and the segment 15.1365-15.35 GHz is allocated to the mobile service on a secondary basis.⁷² Footnote US211 states that, in the band 15.1365-15.35 GHz, applicants for airborne or space station assignments are urged to protect RAS observations in the adjacent band 15.35-15.4 GHz from harmful interference.⁷³

42. The principle SRS use of the band 14.8-15.35 GHz is by NASA's Tracking and Data Relay Satellite System (TDRSS), which is a communication signal relay system that provides tracking and data acquisition services between low earth orbiting (LEO) spacecraft and NASA/customer control and/or data processing facilities.⁷⁴ In the segment 15.2-15.35 GHz, NASA operates spacecraft VLBI phase uplinks, which are discussed below.⁷⁵

43. The only non-Federal Government use permitted in the band 14.8-15.35 GHz is by footnote 5.339 for secondary SRS (passive) and EESS (passive) operations and by footnote US310 for low Earth orbiting satellite-to-TDRSS transmissions in the segment 14.896-15.121 GHz.⁷⁶ The Commission has never issued a license for SRS use under footnote US310.

⁷¹ 47 C.F.R. § 2.106, footnote 5.339.

⁷² The band 14.8-15.35 is part of the larger band 14.7145-15.35 MHz. Fixed and mobile microwave systems operate extensively in this band for various purposes that transmit video, audio, and data. The military also operates fixed, mobile, and maritime mobile air-to-air and air-to-ground datalinks in this band (common data link).

⁷³ 47 C.F.R. § 2.106, footnote US211.

⁷⁴ The TDRSS earth stations near Las Cruces, New Mexico and on Guam transmit in the segment 14.6-15.25 GHz to TDRSS satellites, which are located in the geostationary orbit. (The TDRSS satellites downlink in the band 13.4-14.05 GHz). The New Mexico site has two functionally identical earth stations collectively known as the White Sands Complex. NTIA has recently approved a future TDRSS earth station that will be located in Virginia at either NASA's Wallops Island Space Flight Center or NASA's Langley Space Flight Center. In addition, user satellites in low Earth orbit transmit up to TDRSS satellites in the segment 14.8909-15.1159 GHz (Ku-band single access return link). (TDRSS transmits down to user satellites in low Earth orbit in the band 13.75-13.8 GHz (Ku-band single access forward link).) The Terra spacecraft downloads its data to TDRSS in the segment 14.7145-15.1365 GHz. The five sensors aboard Terra are comprehensively measuring our world's climate system--to observe and measure how Earth's atmosphere, cryosphere, lands, oceans, and life all interact. Data from this mission are used in many research and commercial applications. Terra is a vital part of NASA's Earth Science Enterprise, helping us understand and protect our home planet. See <http://terra.nasa.gov/>.

⁷⁵ See Federal Long-Range Spectrum Plan, Plan for Federal Use of the Radio Frequency Spectrum from 10 to 100 GHz.

⁷⁶ 47 C.F.R. § 2.106, footnote US310, which reads as follows: In the band 14.896-15.121 GHz, non-Federal Government space stations in the space research service may be authorized on a secondary basis to transmit to Tracking and Data Relay Satellites subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal Government stations. The power flux-density produced by such non-Federal Government stations at the Earth's surface in any 4 kHz band for all conditions and methods of modulation shall not exceed:

–148 dB(W/m²) for 0° < θ ≤ 5°

–148 + (θ–5)/2 dB(W/m²) for 5° < θ ≤ 25°

(continued....)

44. At WRC-03, the United States requested that the secondary SRS allocation in the band 14.8-15.35 GHz be upgraded to primary status in order to satisfy requirements for high data rate space science missions.⁷⁷ ITU-R studies have shown that the band 14.8-15.35 GHz is suitable for a primary allocation to satisfy these requirements. The band is most desirable for high data rate SRS missions operating in low-to-mid inclination orbits, geostationary orbits, and the L1/L2 libration points due to the possible sharing of ground station resources located at low-to-mid latitude Deep Space Network (DSN) and National Radio Astronomy Observatory (NRAO) sites. ITU-R studies also demonstrated the feasibility of sharing between the SRS and other services currently allocated on a primary basis in the 14.8-15.35 GHz band. With respect to coordination and notification procedures, the current provisions of Articles 9 and 11 and the proposed sharing criteria would continue to apply among the SRS, fixed, and mobile services in the band 14.8-15.35 GHz. Nevertheless, WRC-03 did not upgrade the secondary SRS allocation in the band 14.8-15.35 GHz to primary status because fixed service users were opposed to this change.

45. In the band 14.8-15.35 GHz, NTIA recommends that the secondary SRS allocation be upgraded to primary status for Federal Government use. NTIA makes this recommendation because (1) TDRSS and other SRS operations support vital national interests and warrant primary status, and (2) studies and operational experience undisputedly show that SRS operations can share with existing services.

46. In addition, NTIA recommends that footnote US310 be revised by using a one megahertz reference bandwidth (instead of the current four kilohertz reference bandwidth) and by correspondingly increasing the power flux-density (pfd) limit by 24 dB. In its request to NTIA for this change, NASA states that the pfd reference bandwidth listed in footnote US310 should be updated to one megahertz in order to correct an error in the *NTIA Manual* and to more appropriately reflect the change from analog to digital transmissions.

47. *Proposal.* As requested by NTIA, we propose to upgrade the secondary SRS allocation in the band 14.8-15.35 GHz to primary status for Federal Government use, except that SRS (passive) use of the segment 15.2-15.35 GHz would retain secondary status.⁷⁸ We tentatively find that the upgrade is in the national interest. Specifically, the United States has developed extensive SRS operations in this band at great expense and these operations merit the protection that a primary allocation provides. However, since this primary SRS allocation would be in derogation of the ITU *Radio Regulations*, we note that, for example, Federal Government SRS receive earth stations would not be protected from stations in the fixed and mobile services operating in neighboring countries.

(...continued from previous page)

$-138 \text{ dB(W/m}^2\text{)} \text{ for } 25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizontal). These limits relate to the power flux-density and angles of arrival which would be obtained under free-space propagation conditions.

⁷⁷ See *U.S. Proposals for WRC-03*, Proposal C (Agenda Item 1.12), at pages 51-52. Spacecraft for these missions will carry telescopes to conduct sky surveys or Space Very Long Baseline Interferometry (SVLBI) observations. They may also carry other passive instruments to measure phenomenon such as the Earth's magnetosphere and solar flares. These missions will be limited in number and will generally be in a polar or equatorial orbit, with some at geostationary altitudes; highly elliptical orbit; or at the L1 or L2 Sun/Earth equilibrium libration points that are approximately 1.9 million kilometers from Earth.

⁷⁸ The table entry for the SRS allocation would not be limited and thus, SRS uplinks, SRS downlinks, SRS (active), and SRS (passive) operations would be allowed on a primary basis in the band 14.8-15.35 GHz, except in the segment 15.2-15.35 GHz where footnote 5.339 would limit SRS (passive) use to secondary status.

48. In addition, we propose to revise footnote US310 by using a reference bandwidth that is more appropriate for today's digital transmissions than a reference bandwidth based on an analog channel. We request comment on these proposals.

3. SRS and EESS Downlinks at 25.5-27 GHz and ISS at 25.25-27.5 GHz

49. *Background.* The band 25.25-27.5 GHz is allocated to the fixed, mobile, and ISS services on a primary basis throughout the world. ISS use of the 25.25-27.5 GHz band is limited by footnote 5.536 to SRS and EESS applications, and also transmissions of data originating from industrial and medical activities in space.⁷⁹ The band 25.25-27 GHz is also allocated to the standard frequency and time signal-satellite (Earth-to-space) on a secondary basis throughout the world. Further, the band 25.5-27 GHz is allocated to the EESS (space-to-Earth) on a primary basis throughout the world. Footnote 5.536A states that administrations installing EESS earth stations cannot claim protection from stations in the fixed and mobile services operated by neighboring administrations.⁸⁰ The band 27-27.5 GHz is allocated to the fixed-satellite service (FSS) (Earth-to-space) on a primary basis in Regions 2 and 3. Footnote 5.537 states that space services using non-geostationary (NGSO) satellites operating in the ISS in the band 27-27.5 GHz are exempt from the general provision that NGSO satellite systems must not cause unacceptable interference to geostationary-satellite systems in the FSS and the broadcasting-satellite service.⁸¹

50. In the United States, the band 25.5-27 GHz is Federal/non-Federal Government shared spectrum that is primarily used by Federal agencies. All of the international allocations described in the preceding paragraph have been adopted in the Federal Government Table, except for the FSS uplink allocation.⁸² NASA has three geostationary TDRSS space stations in orbit that currently have the capability to receive transmissions in the band 25.25-27 GHz from low Earth-orbiting satellites.⁸³ In the future, NASA expects to use TDRSS space stations extensively to satisfy SRS and EESS wide bandwidth data requirements that cannot be satisfied in the band 14.896-15.121 GHz. Additionally, there are currently two new systems under development that will operate in the band 25.5-27 GHz. Specifically, NASA is developing a geostationary Solar Dynamics Observatory (SDO) system that will downlink SRS data to White Sands, New Mexico and the National Oceanic and Atmospheric Administration (NOAA) is developing a non-geostationary National Polar-orbiting Operational Environmental Satellite System (NPOESS) that will downlink EESS data to a limited number of earth stations. Finally, NASA and NOAA expect to build additional wide bandwidth EESS systems in this band.

51. In the non-Federal Government Table, the band 25.25-27.5 GHz is allocated to the EESS (space-to-space) on a secondary basis; the segment 25.25-27 GHz is allocated to the standard frequency

⁷⁹ 47 C.F.R. § 2.106, footnote 5.536.

⁸⁰ 47 C.F.R. § 2.106, footnote 5.536A. This footnote also states that EESS earth stations should take into account Recommendation ITU-R SA.1278. In addition, footnote 5.536B states that, in certain countries (including only Brazil in Region 2), EESS earth stations in the band 25.5-27 GHz cannot constrain the use and deployment of stations in the fixed and mobile services. 47 C.F.R. § 2.106, footnote 5.536B.

⁸¹ 47 C.F.R. § 2.106, footnote 5.537. *See* ITU *Radio Regulations*, Article 22, No. 22.2.

⁸² The band 25.5-27 GHz is used for low density fixed point-to-point links for voice, data, and video at government laboratories and test ranges. The band 25.25-27 GHz is a possible future band for flight test telemetry.

⁸³ TDRSS satellites transmit down to LEO satellites in the band 22.55-23.55 GHz.

and time signal-satellite (Earth-to-space) on a secondary basis; and the segment 25.5-27 GHz is allocated to the EESS (space-to-Earth) on a secondary basis.⁸⁴

52. At WRC-03, the United States requested that the band 25.5-27 GHz (26 GHz) be allocated to the SRS (space-to-Earth) in order to satisfy requirements for high data rate space science missions.⁸⁵ ITU-R studies have shown that the 26 GHz band is suitable for a primary SRS allocation to satisfy these requirements. The 26 GHz band is most desirable for high data rate SRS missions operating in high inclination orbits due to the possible sharing of ground station resources with EESS missions operating in that band. Sharing of ground station resources can result in substantial cost and schedule benefits for international space agencies implementing high rate SRS missions. The 26 GHz band also affords SRS missions the flexibility of using a wide bandwidth space-to-space link in an existing or planned data relay satellite network as well as wide bandwidth downlinks. The United States also proposed that administrations operating SRS earth stations in the band 25.5-27 GHz not be able to claim protection from stations in the fixed and mobile services operated by other administrations, that is, that footnote 5.536A be revised to apply to the SRS as well as the EESS.

53. WRC-03 allocated the band 25.5-27 GHz for SRS downlinks on a primary basis. WRC-03 also revised footnote 5.536A to apply to both SRS and EESS earth stations. Specifically, footnote 5.536A was revised to read as follows:

5.536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account Recommendations ITU-R SA.1278 and ITU-R SA.1625, respectively.

54. Finally, WRC-03 added SRS to list of space radiocommunication services in Article 21 of the ITU *Radio Regulations* that must adhere to maximum pfd limits ("hard limits") in the band 25.25-27.5 GHz.⁸⁶ Therefore, the pfd in dB(W/m²) for angles of arrival (δ) above the horizontal plane at the Earth's surface produced by emissions from EESS and SRS space stations in the band 25.5-27 GHz and from ISS space stations in the band 25.25-27.5 GHz for all conditions and for all methods of modulation must not exceed:

$$\begin{aligned} & -115 && \text{for } 0^\circ \leq \delta \leq 5^\circ \\ & -115 + 0.5(\delta - 5) && \text{for } 5^\circ \leq \delta \leq 25^\circ \end{aligned}$$

⁸⁴ In a recent rule making, we raised the secondary EESS (space-to-Earth) allocation in the band 25.5-27 GHz to primary status for Federal Government use, but maintained secondary status for non-Federal Government use. *Above 28 MHz R&O* at paras. 53-56. In response to the requests of two commercial remote sensing operators (DigitalGlobe, Inc. and Space Imaging L.L.C.) for a similar non-Federal upgrade, we have had discussion with NTIA and have been able to reach an agreement on this matter. See para. 55, below, wherein NTIA proposes a primary EESS (space-to-Earth) allocation for non-Federal Government use.

⁸⁵ In support of this request, the United States stated the following. Resolution 723 (Rev. WRC-2000) *resolves 4*, recommended that WRC-03 consider a review of the existing SRS allocation near 26 GHz, with a view to accommodating wideband SRS downlink applications. This *resolves* is in response to a need for allocations to support planned high data rate SRS missions requiring bandwidths up to 400 megahertz. Spacecraft for these missions will carry telescopes to conduct sky surveys or SVLBI observations. They may also carry other passive instruments to measure phenomenon such as the Earth's magnetosphere and solar flares. These missions will be limited in number and will generally be in a polar or equatorial orbit, with some at geostationary altitudes; highly elliptical orbit; or at the L1 or L2 Sun/Earth equilibrium libration points that are approximately 1.9 million kilometers from Earth. See *U.S. Proposals for WRC-03*, Proposal C (Agenda Item 1.12), at pages 51-52.

⁸⁶ See ITU *Radio Regulations* at Article 21 (Terrestrial and space services sharing frequency bands above 1 GHz), Section V (Limits of power flux-density from space stations), No. 21.16 and Table 21-4.

-105 for $25^\circ \leq \delta \leq 90^\circ$

These limits relate to the pfd which would be obtained under assumed free-space propagation conditions. The reference bandwidth is 1 MHz.⁸⁷

55. NTIA recommends that the band 25.5-27 GHz be allocated to the SRS (space-to-Earth) on a primary basis for Federal Government use.⁸⁸ In addition, NTIA recommends that the secondary non-Federal Government allocation for the EESS (space-to-Earth) be upgraded to primary status. Specifically, NTIA recommends that the table entry for the EESS (space-to-Earth) allocation be deleted and that footnote US258 be revised to read as follows:

US258 In the bands 8025-8400 MHz and 25.5-27 GHz, the Earth exploration-satellite service (space-to-Earth) is allocated on a primary basis for non-Federal Government use. Authorizations are subject to a case-by-case electromagnetic compatibility analysis.

NTIA also recommends that footnote 5.536A be added to the non-Federal Government Table.

56. NTIA also recommends that the secondary non-Federal Government allocation for the EESS (space-to-space) in the band 25.25-27.5 GHz be broadened to a secondary ISS allocation. NTIA further recommends that international footnote 5.536 be added to the non-Federal Government Table, thereby limiting the use of this ISS allocation to SRS and EESS applications, and also to transmissions of data originating from industrial and medical activities in space.

57. On September 25, 2003, NTIA commented in ET Docket 02-305 concerning the band 25.5-27 GHz, which it characterized as being “very unique and important to [Federal] Government agencies.”⁸⁹ First, the band 25.25-27.5 GHz is currently allocated on a primary basis only for Federal Government use. Second, the Federal Government will also be implementing EESS satellite systems in this spectrum, *e.g.*, TDRSS already has the capability and the Department of Commerce has submitted plans for its National Polar-orbiting Operational Environmental Satellite System. NTIA states that any non-Federal Government EESS system would need to coordinate with these Federal operations. NTIA also noted that at WRC-03 the United States negotiated a primary SRS (downlink) allocation in the band 25.5-27 GHz based on Federal Government requirements.

58. As a result of the normal IRAC coordination process, NTIA provided additional information on sharing requirements for the band 25.5-27 GHz. Specifically, NTIA stated that within the North Atlantic Treaty Organization (NATO), the band 26.5-27.5 GHz is a harmonized band for terrestrial operations. In order to protect Federal Government terrestrial receivers, NTIA requests that non-Federal EESS downlinks operating in the band 25.5-27 GHz meet the pfd limits contained in Article 21 of the Radio Regulations, which are shown in paragraph 54, above.

59. NTIA also states that it is important to ensure that non-Federal Government receiving EESS earth stations are implemented in the band 25.5-27 GHz in such a way that they do not unduly constrain the future use of this band by Federal Government stations in the fixed and mobile services. Therefore, NTIA requests that the Commission seek comment from potential EESS applicants as to whether the following constraints would be helpful in fostering compatibility in the band 25.5-27 GHz: (1) A limitation on the number of U.S. earth stations for any non-Federal Government EESS system (*e.g.*, four earth stations) that uses this band; (2) A requirement that non-Federal Government spacecraft using the

⁸⁷ See *WRC-03 Final Acts* at Article 21, Section V, Table 21-4.

⁸⁸ See NTIA WRC-03 Recommendations, Enclosure 1 at Agenda Item 1.12 and Enclosure 2 at p. 34.

⁸⁹ See letter from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, NTIA, to Edmond J. Thomas, Chief, Office of Engineering Technology, FCC, dated September 25, 2003.

band turn off their transmitters when not in view of a receiving earth station. This requirement could be implemented either for all cases or for those cases where the spacecraft transmission bandwidth is greater than some to-be-determined minimum value in megahertz; and (3) the pfd at the geostationary orbit from a non-Federal Government EESS system be limited to the values indicated in Recommendation ITU-R SA.1278 to protect TDRSS reception from low Earth-orbiting user spacecraft.⁹⁰ Specifically, the ITU values are as follows: (1) EESS satellites in sun-synchronous orbit or in an orbit that is proximate to the orbits of the TDRSS user satellites shall not produce a pfd greater than -155 dB(W/m²) in 1 MHz at any location on the geostationary orbit (GSO) for more than 0.1% of the time; and (2) EESS satellites in orbits other than that mentioned above shall not produce a pfd greater than -155 dB(W/m²) in 1 MHz at any location on the GSO for more than 1% of the time.⁹¹ In order to protect Federal Government operations, NTIA stated that it may subsequently request that certain requirements, including those mentioned above, be contained either in a United States footnote or in the Commission's service rules.

60. *Proposal.* We propose to upgrade the secondary non-Federal Government allocation for EESS downlinks in the band 25.5-27 GHz to primary status. We believe that this upgrade is necessary to meet the requirements of the commercial remote sensing industry and is consistent with the Fact Sheet on U.S. Commercial Remote Sensing Policy that was released by the White House on April 25, 2003.⁹² Specifically, we propose to revise footnote US258 to include the band 25.5-27 GHz in its text, to add footnote US258 to the non-Federal Government Table in the band 25.5-27 GHz, and consequently to delete the table entry for the secondary EESS downlink allocation from the non-Federal Government Table.

61. By adding the band 25.5-27 GHz to footnote US258, we would also subject each non-Federal Government authorization to a case-by-case electromagnetic compatibility (EMC) analysis. Because of existing and planned Federal Government SRS and EESS requirements in the band 25.5-27 GHz, which are discussed above, we believe that it is important that non-Federal Government EESS downlinks operated in this band be designed to ensure compatibility with Federal Government systems. We also propose to add footnote 5.536A to the non-Federal Government Table in the band 25.5-27 GHz. This action would provide guidance to earth station applicants, *e.g.*, Annex 1 provides a methodology for estimating needed separation distances between EESS earth stations and fixed stations,⁹³ and would better alert commercial remote sensing operators of the EESS downlink allocation's status in border areas, *i.e.*, where possible, these operators should consider placing their receive earth stations away from border areas.

⁹⁰ See Recommendation ITU-R SA.1278 titled "Feasibility of Sharing between Earth Exploration-Satellite Service (space-to-Earth) and the fixed, inter-satellite, and mobile services in the band 25.5-27.0 GHz," at <http://www.itu.int/rec/recommendation.asp?type=items&lang=e&parent=R-REC-SA.1278-0-199710-I>.

⁹¹ See Recommendation ITU-R SA.1278, *recommends* 3.

⁹² See Fact Sheet at <http://www.fas.org/irp/offdocs/nsdp/remsens.html>. This document states the fundamental goal of this national policy is to "advance and protect U.S. national security and foreign policy interests by maintaining the nation's leadership in remote sensing space activities, and by sustaining and enhancing the U.S. remote sensing industry;" and further states that U.S. companies are "encouraged to build and operate commercial remote sensing space systems whose operational capabilities, products and services are superior to any current or planned foreign commercial systems." We observe that first generation commercial remote sensing satellite systems use the band 8025-8400 MHz, but the U.S. commercial remote sensing industry has identified the band 25.5-27 GHz for wider bandwidth operations.

⁹³ See Recommendation ITU-R SA.1278, Annex 1 titled "Separation distances between EESS earth stations and FS stations around 26 GHz."

62. In order to protect Federal Government terrestrial receivers, we propose to require that non-Federal EESS space stations transmitting in the band 25.5-27 GHz meet the pfd limits contained in Article 21 of the ITU *Radio Regulations*. We would codify this requirement by adding these pfd limits to Part 25 of the Commission's Rules. Based on a request from NTIA, we seek comment from potential EESS applicants as to whether the constraints listed in paragraph 59, above, would be helpful in fostering compatibility between Federal and non-Federal Government systems.

63. We also propose to broaden the secondary non-Federal Government allocation for the EESS (space-to-space) in the band 25.25-27.5 GHz to a secondary ISS allocation. However, we also propose to adopt footnote 5.536, which would limit the use of this ISS allocation to SRS and EESS applications, and also to transmissions of data originating from industrial and medical activities in space. This restriction is necessary to ensure that this frequency band meets the needs of the scientific community without being overtaken for FSS or MSS use. Nevertheless, we request comment on the need for this restriction. In order to protect Federal Government terrestrial receivers, we propose to require that non-Federal ISS space stations transmitting in the band 25.25-27.5 GHz meet the pfd limits contained in Article 21 of the ITU *Radio Regulations*. The ISS pfd requirements and the EESS pfd requirements are the same and would be shown once in Part 25 of the Commission's Rules.

64. We propose to allocate the band 25.5-27 GHz to the SRS (space-to-Earth) on a primary basis for Federal Government use. This action would provide a primary SRS allocation to satisfy Federal requirements for high data rate space science missions. We request comment on all of these proposals.

4. EESS (active) at 432-438 MHz

65. *Background.* The band 432-438 MHz is allocated to the radiolocation service on a primary basis throughout the world. The band 432-438 MHz is allocated to the amateur service on a primary basis in Region 1 and on a secondary basis in Regions 2 and 3, except as stated in country footnotes 5.272 and 5.278.⁹⁴ In the segment 435-438 MHz, the amateur-satellite service (AMSAT) may operate subject to not causing harmful interference to other services operating in accordance with the International Table (footnote 5.282).⁹⁵ In addition, there are several footnote allocations that pertain to this spectrum.⁹⁶

66. In the United States, the band 432-438 MHz is allocated to the radiolocation service on a primary basis for Federal Government use. The use of the radiolocation service allocation is limited to the military services,⁹⁷ except that pulse-ranging and spread spectrum radiolocation systems may be authorized for Federal non-military and non-Federal Government use on a secondary basis along the shorelines of the 48 contiguous States and Alaska.⁹⁸ The band 432-438 MHz is allocated to the amateur service on a secondary basis.⁹⁹ International footnote 5.282 has been adopted domestically and thus, the

⁹⁴ As an exception to the Region 1 primary allocation for the amateur service, the amateur service in France is allocated on a secondary basis. As exceptions to the Region 2 secondary allocation, the amateur service in the countries listed in footnote 5.278 has primary status. 47 C.F.R. § 2.106, footnotes 5.272 and 5.278.

⁹⁵ 47 C.F.R. § 2.106, footnote 5.282.

⁹⁶ 47 C.F.R. § 2.106, footnote 5.138 and 5.280 (In Region 1, ISM applications at 433.05-434.79 MHz); 5.271 (aeronautical radionavigation service); 5.276 and 5.277 (fixed service); 5.279 (In Mexico, primary land mobile service allocation in the segment 432-435 MHz); and 5.281 (space operation service).

⁹⁷ 47 C.F.R. § 2.106, footnote G2.

⁹⁸ 47 C.F.R. § 2.106, footnote US217.

⁹⁹ In the areas listed in footnote US7, special conditions apply to use the amateur service allocation. 47 C.F.R. § 2.106, footnote US7.

amateur-satellite service may operate in the segment 435-438 MHz subject to not causing harmful interference to other services operating in accordance with the International Table.

67. At WRC-03, the band 432-438 MHz was allocated to the EESS (active) on a secondary basis throughout the world. WRC-03 limited the use of this allocation through footnote 5.279A, which reads as follows:

5.279A The use of this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R SA.1260-1. Additionally, the Earth exploration-satellite service (active) in the band 432-438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China.

The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. 5.29 and 5.30.

68. On February 20, 2004, NTIA addressed this EESS allocation in a letter to the Commission.¹⁰⁰ Specifically, NTIA noted that while the United States originally opposed the allocation, WRC-03 approved a worldwide secondary allocation for the EESS (active), which incorporates certain operational restrictions delineated in ITU-R SA 1260-1,¹⁰¹ and NTIA now expects that foreign systems as well as NASA will want to operate under the allocation. Therefore, NTIA recommends that the Commission provide an allocation status under which the United States would authorize EESS (active) in the band.

69. NTIA states that ITU-Recommendation SA.1260-1 effectively limits the operational use of 432-438 MHz EESS to areas outside the United States. However, NASA has indicated a need to perform some limited pre-operational testing of its systems within line-of-sight of its U.S. control stations. In order to account for the required use of the EESS allocation in the United States, a new US footnote is proposed. As EESS satellites within line-of-sight of the United States would operate solely for the purpose of short duration pre-operational testing, NTIA states that there will be minimal impact to any other services. Therefore, NTIA recommends that the following United States footnote be proposed in order to clarify the allocation status of U.S. authorized EESS:

In the band 432-438 MHz, the Earth exploration-satellite service (active) is allocated on a secondary basis. Stations in the Earth exploration-satellite service (active) shall not be operated within line-of-sight of United States except for the purpose of short duration pre-operational testing. Operations under this allocation shall not cause harmful interference to, nor claim protection from, the other services allocated in the band in the United States, including secondary services.

70. *Proposal.* After additional discussions with NTIA, we tentatively find that any secondary EESS (active) allocation in the band 432-438 MHz should be limited to Federal Government use and that this allocation should not cause harmful interference to, nor claim protection from, any other services allocated in the band in the United States, including the amateur-satellite service. Accordingly, we propose to adopt the following United States footnote:

USzzz In the band 432-438 MHz, the Earth exploration-satellite service (active) is allocated on a secondary basis for Federal Government use. Stations in the Earth exploration-satellite service (active) shall not be operated within line-of-sight of United States except for the purpose of short duration pre-operational testing. Operations under this allocation shall not cause harmful interference to, nor claim protection from, any other services allocated in the band 432-438 MHz in the United States, including secondary services and the amateur-satellite service.

¹⁰⁰ See letter from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, NTIA, to Edmond J. Thomas, Chief, OET, FCC, dated February 20, 2004.

¹⁰¹ See Draft Revision to Recommendation ITU-R SA.1260 titled "Feasibility of sharing between active spaceborne sensors and other services in the range 420-470 MHz," Document 7/BL/22-E, dated February 11, 2003.

The adoption of this footnote would permit NASA to perform limited pre-operational testing of its systems within line-of-sight of its U.S. control stations, provided that it does not cause harmful interference to the radiolocation, amateur, and amateur-satellite services in the United States. We request comment on this proposal.

71. Table 3, below, gives an overview of our major proposals for the space radiocommunication services discussed in this section.

Table 3: Major Proposals for the Space Radiocommunication Services (Primary allocations are shown in capitals; secondary allocations are in normal characters, unless otherwise noted)

Band	International Allocations Prior to WRC-03	Existing U.S. Allocations	International Allocations as Revised at WRC-03	Proposed U.S. Allocations	Remarks
7125-7235 MHz	FIXED & MOBILE 5.458 (Passive sensor measurements are carried out in this band. Administrations should bear in mind the needs of the EESS (passive) and SRS (passive) in their future planning of this band) 5.460 (The band 7145-7235 GHz is also allocated for SRS uplinks on a primary basis. The use of the band 7145-7190 MHz is restricted to deep space; no emissions to deep space shall be effected in the band 7190-7235 MHz)	7125-7190 MHz Federal FIXED	7125-7145 MHz FIXED & MOBILE	7125-7145 MHz Federal FIXED & G116	No substantive change.
		G116 (7125-7155 MHz is allocated for Federal space operation uplinks at up to 2 sites)	5.458	5.458	
		5.458 US252 (7145-7190 MHz is allocated for SRS uplinks for deep space communications at Goldstone)	7145-7235 MHz FIXED & MOBILE SRS (Earth-to-space)	7145-7190 MHz Federal FIXED , SRS (deep space) (Earth-to-space) & G116	In 45 megahertz, the Federal SRS deep space uplink allocation in footnote US252 is explicitly recognized as being a primary allocation and is highlighted by moving it up as a table entry.
		7190-7235 MHz Federal FIXED & SRS (Earth-to-space)	5.460 (SRS use of 7145-7190 MHz is restricted to deep space communications; no emissions to deep space are permitted in 7190-7235 MHz. GSO SRS satellites in the band 7190-7235 MHz are not protected from fixed and mobile services)	5.458 US262 (non-Federal SRS deep space uplink use allocated on secondary basis; all use limited to Goldstone)	
14.8-15.35 GHz	FIXED & MOBILE Space research 5.339 (The band 15.2-15.35 GHz is allocated to the EESS (passive) and SRS (passive) on a secondary basis)	5.458	5.458	7190-7235 MHz Federal FIXED & SRS (Earth-to-space) Gyyy (deep space communications prohibited; GSO SRS satellites not protected from fixed & mobile)	In 45 megahertz, deep space communications are prohibited & geostationary (GSO) SRS satellites are not protected from fixed & mobile services.
				5.458	
		14.8-15.1365 GHz Federal MOBILE , fixed, and space research	No change.	14.8-15.1365 GHz Federal MOBILE , fixed & SRS	In 550 megahertz, raise secondary Federal SRS allocation to primary status, but these SRS earth stations are not protected near the border. Change method of calculating non-Federal pfd in US310.
		US310 (secondary non-Fed SRS satellites may transmit in the band 14.896-15.121 GHz)		US310	
25.25-25.5 GHz	FIXED & MOBILE ISS 5.536 (limited to SRS & EESS applications & transmission of data originating from industrial & medical activities in space) Standard frequency & time signal-satellite (Earth-to-space) (SF&TSS uplinks)	15.1365-15.35 GHz Federal FIXED , mobile, & SRS	No change.	15.1365-15.35 GHz Federal FIXED , mobile, and SRS	
		5.339 US211 (SRS & airborne operators urged to protect RAS)		5.339 US211	
		Federal FIXED , MOBILE and ISS 5.536		Federal FIXED , MOBILE and ISS 5.536	In 250 megahertz, broaden the secondary non-Federal EESS (space-to-space) allocation to a secondary ISS allocation, but limit its use by footnote 5.536.
		Secondary Federal & non-Federal SF&TSS uplinks		Secondary Federal & non-Federal SF&TSS uplinks	
25.5-27 GHz	FIXED & MOBILE ISS 5.536 EESS (space-to-Earth) 5.536A (EESS earth stations not protected from fixed & mobile operations in other countries) 5.536B (EESS may not constrain the use & deployment of fixed & mobile in certain countries) Secondary SF&TSS uplinks	Secondary non-Federal EESS (space-to-space)	FIXED , MOBILE & ISS 5.536 EESS & SRS downlinks 5.536A (EESS & SRS earth stations not protected from fixed & mobile operations in other countries) 5.536B Secondary SF&TSS uplinks	Federal FIXED , MOBILE , ISS 5.536, EESS & SRS downlinks 5.536A	In 1.5 gigahertz, (1) allocate to Federal SRS downlinks on primary basis; (2) raise secondary non-Federal EESS downlink allocation to primary status, limited by 5.536A; & (3) broaden the secondary non-Federal EESS (space-to-space) allocation to secondary ISS, limited by 5.536.
		Secondary Federal & non-Federal SF&TSS uplinks		Secondary non-Federal ISS 5.536	
		Secondary non-Federal EESS downlinks 5.536A (space-to-space)		US258 (Primary non-Federal EESS downlinks, subject to case-by-case electromagnetic compatibility analysis) 5.536A	
				Secondary Federal & non-Federal SF&TSS uplinks	
27-27.5 GHz	FIXED , MOBILE & ISS 5.536 5.537 (Region 2 & 3 NGSO satellites have equal status with GSOs) In Regions 2 & 3, FSS uplinks	Federal FIXED , MOBILE , and ISS 5.536	No change.	Federal FIXED , MOBILE , and ISS 5.536	In 500 megahertz, broaden secondary non-Federal EESS (space-to-space) allocation to secondary ISS, limited by 5.536.
		Secondary non-Federal EESS (space-to-space)		Secondary non-Federal ISS 5.536	

D. RNSS Allocations

72. The Global Positioning System (GPS), which currently consists of 24 satellites operated by the U.S. Government, is authorized under the RNSS allocation. These satellites allow any person with a GPS receiver to determine his or her precise longitude, latitude, altitude, and time anywhere on the planet.¹⁰² GPS currently uses the RNSS downlink allocations in the bands 1215-1240 MHz and 1559-1610 MHz (no changes are proposed for the band 1559-1610 MHz in this proceeding). GPS provides two levels of service: a Standard Positioning Service (SPS) using the L1 frequency¹⁰³ and a Precise Positioning Service (PPS) using the L1 and L2 frequencies.¹⁰⁴ SPS is available to all users on a continuous, worldwide basis, free of any direct user charge.¹⁰⁵ Table 4, which is at the end of this section, gives an overview of our RNSS proposals.

1. RNSS at 960-1300 MHz

73. *Background.* The band 960-1215 MHz is allocated to the aeronautical radionavigation service (ARNS) on a primary basis throughout the world. International footnote 5.328 states that ARNS use of the band 960-1215 MHz is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities.¹⁰⁶ Prior to WRC-03, the band 1164-1215 MHz was allocated to the RNSS (space-to-Earth) (space-to-space) on primary basis by footnote 5.328A, subject to technical limits and a requirement that RNSS stations not cause interference to, nor claim protection from, stations in the ARNS.¹⁰⁷

74. The band 1215-1300 MHz is allocated to the radiolocation service, RNSS (space-to-Earth) (space-to-space), EESS (active), and SRS (active) on a co-primary basis throughout the world. The band 1240-1300 MHz is also allocated to the ARNS on a primary basis in the United States and Canada (5.334)¹⁰⁸ and to the amateur service on a secondary basis throughout the world. The amateur-satellite

¹⁰² Each GPS satellite takes 12 hours to orbit the Earth. These satellites are equipped with accurate clocks so that they can broadcast signals with a precise time message. The GPS receiver uses the time signals from multiple satellites to determine precise latitude, longitude, and altitude.

¹⁰³ The International Civil Aviation Organization (ICAO) has designated the L1 links of GPS and the Russian GLONASS system as the principal elements of the Global Navigation Satellite System (GNSS). The GPS L1 SPS ranging signal is a 2.046 megahertz null-to-null bandwidth signal centered about 1575.42 MHz. The transmitted ranging signal that comprises the GPS-SPS is not limited to a null-to-null signal and extends through the band 1563.42-1587.42 MHz. The Wide Area Augmentation System (WAAS), when it becomes operational, will utilize the same band and carrier frequency as GPS L1.

¹⁰⁴ The GPS L2 link shares the band 1215-1240 MHz with radiolocation services, such as military radars. The 1240-1260 MHz band is shared by GLONASS L2 and the nationwide joint surveillance system radar network operated by the Federal Aviation Administration and the Department of Defense. The GPS L2 carrier frequency is 1227.60 MHz. Although the L2 frequency is currently not part of SPS, the U.S. Government has decided to add a second non-safety-of-life coded signal at the GPS L2 frequency on satellites scheduled for launch beginning in 2005.

¹⁰⁵ PPS is an encoded signal primarily intended for use by the U.S. Department of Defense.

¹⁰⁶ 47 C.F.R. § 2.106, footnote 5.328.

¹⁰⁷ Footnote 5.328A reads as follows: *Additional allocation:* the band 1164-1215 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) (space-to-space) on a primary basis. The aggregate power flux-density produced by all the space stations of all radionavigation-satellite systems at the Earth's surface shall not exceed the provisional value of -115 dB(W/m²) in any 1 MHz band for all angles of arrival. Stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical-radionavigation service. The provisions of Resolution 605 (WRC-2000) apply.

¹⁰⁸ 47 C.F.R. § 2.106, footnote 5.334.

service (Earth-to-space) (AMSAT uplinks) may operate in the band 1260-1270 MHz, subject to not causing harmful interference to other services operating in accordance with the Table.¹⁰⁹

75. While the use of the radiolocation service and the ARNS are unconstrained in the band 1215-1300 MHz, stations in the EESS (active) and SRS (active), which are commonly referred to as active spaceborne sensors, and the RNSS are limited. Specifically, RNSS (space-to-space) use of the band 1215-1300 MHz is not intended to provide safety service applications, and its use will not impose any additional constraints on other systems or services operating in accordance with the International Table.¹¹⁰ Active spaceborne sensors must not cause interference to, claim interference from, or otherwise impose constraints on the operation or development of the radiolocation service in the band 1215-1300 MHz, the RNSS in the segment 1215-1260 MHz, the ARNS in the United States and Canada in the band 1240-1300 MHz, and other primary services.¹¹¹

76. In the United States, the band 960-1215 MHz is Federal/non-Federal Government shared spectrum that is allocated to the ARNS on a primary basis. International footnote 5.328 has been adopted domestically, thereby reserving this ARNS allocation for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. This band is heavily used for safety-of-life services within national and international airspace systems. Nearly all aspects of aircraft identification, tracking, control, navigation, collision avoidance, and landing guidance are carried out in this band. Major ARNS systems in this band include Distance Measuring Equipment (DME), Air Traffic Control Radar Beacon System (ATCRBS), the military's tactical air navigation system (TACAN), and the Traffic Alert and Collision Avoidance System (TCAS). These aeronautical systems are not only essential to civil and military aircraft, but also to special users such as the U.S. Space Shuttle program. In addition, footnote US224 states that Federal Government systems utilizing spread spectrum techniques may, under limited circumstances, operate in the band 960-1215 MHz on the condition that harmful interference is not caused to ARNS.¹¹²

77. The band 1215-1300 MHz is allocated to the EESS (active), SRS (active), and radiolocation service on a primary basis for Federal Government use.¹¹³ The use of the radiolocation service allocation in this band is primarily for the military services, except that limited secondary use is permitted by other Federal agencies in support of experimentation and research programs.¹¹⁴ The sub-band 1215-1240 MHz is also allocated to the RNSS (space-to-Earth) (space-to-space) on a primary basis for Federal Government use.¹¹⁵ Footnotes 5.332 and 5.335 have been added to the Federal Government Table,

¹⁰⁹ 47 C.F.R. § 2.106, footnote 5.282.

¹¹⁰ 47 C.F.R. § 2.106, footnote 5.329A.

¹¹¹ 47 C.F.R. § 2.106, footnotes 5.332, 5.335, and 5.335A. In certain Region 1 and 3 countries, the band 1215-1300 MHz is also allocated to the fixed and mobile services on a co-primary basis (5.330) and/or to the radionavigation service on a primary basis (5.331). 47 C.F.R. § 2.106, footnotes 5.330 and 5.331. In addition, the use of the RNSS allocation in the band 1215-1300 MHz is subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service in the countries listed in footnote 5.331. 47 C.F.R. § 2.106, footnote 5.329.

¹¹² 47 C.F.R. § 2.106, footnote US224.

¹¹³ Radiolocation use is primarily for the military services. 47 C.F.R. § 2.106, footnote G56.

¹¹⁴ 47 C.F.R. § 2.106, footnote G56. The major radiolocation systems in this band are operated by the Department of Defense. Radars in this band are also mounted on tethered balloons along the southern border of the U.S. for drug interdiction purposes to detect low-flying aircraft entering U.S. airspace.

¹¹⁵ GPS makes use of this RNSS downlink allocation with a center frequency at 1227.6 MHz, which is generally known as the L2 link.

thereby requiring that active spaceborne sensors not cause interference to, claim interference from, or otherwise impose constraints on the operation or development of the RNSS and radiolocation service in the sub-band 1215-1260 MHz and the ARNS in the sub-band 1240-1300 MHz.

78. Footnote 5.334 has been added to the U.S. Table, thereby allocating the sub-band 1240-1300 MHz to the ARNS on a primary basis for Federal and non-Federal Government use. The band 1215-1300 MHz is allocated to the EESS (active) and SRS (active) on a secondary basis for non-Federal Government use. The sub-band 1240-1300 MHz is allocated to the amateur service on a secondary basis and the sub-band 1260-1270 MHz is available for AMSAT uplinks.

79. At WRC-03, the primary RNSS (space-to-Earth) (space-to-space) allocation in the band 1164-1215 MHz was removed from footnote 5.328A and made a table entry. WRC-03 revised footnote 5.328A to establish conditions for the protection of the ARNS from RNSS systems in the band 1164-1215 MHz.¹¹⁶ WRC-03 also revised footnote 5.329 to establish conditions for the protection of radiodetermination services from RNSS systems in the band 1215-1300 MHz.¹¹⁷ WRC-03 decided to continue to resolve RNSS intersystem technical compatibility issues on a bilateral basis until January 1, 2005; after which, normal coordination procedures would apply.¹¹⁸

80. In a recent action, we allocated the band 1164-1215 MHz to the RNSS (space-to-Earth) (space-to-space) on a primary basis on the condition that ARNS is protected (footnote US385).¹¹⁹ We took this action based on NTIA's recommendation. We stated that in this Omnibus NPRM, we would address how best to reference the WRC-03 protection criteria for ARNS, whether by adopting revised footnote 5.328A or by modifying our Part 25 satellite service rules.

81. *Proposals.* We propose to remove the RNSS (space-to-Earth) (space-to-space) allocation in the band 1164-1215 MHz from footnote US385 and make it a table entry.¹²⁰ We also propose to adopt

¹¹⁶ Footnote 5.328A was revised to read as follows: "Stations in the radionavigation-satellite service in the band 1164-1215 MHz shall operate in accordance with the provisions of Resolution 609 (WRC-03) and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1215 MHz. No. 5.43A does not apply. The provisions of No. 21.18 shall apply." See *WRC-03 Final Acts*, Resolution 609 (Coordination and bilateral resolution of technical compatibility issues for RNSS networks and systems in the bands 1164-1300 MHz, 1559-1610 MHz and 5010-5030 MHz).

¹¹⁷ Footnote 5.329 was revised to read as follows: "Use of the radionavigation-satellite service in the band 1215-1300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215-1300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. 5.43 shall not apply in respect of the radiolocation service. Resolution 608 (WRC-03) shall apply." See *WRC-03 Final Acts*, Resolution 608 (Use of the frequency band 1215-1300 MHz by systems of the RNSS (space-to-Earth)).

¹¹⁸ Specifically, WRC-03 adopted footnote 5.328B, which reads as follows: "The use of the bands 1164-1300 MHz, 1559-1610 MHz and 5010-5030 MHz by systems and networks in the radionavigation-satellite service for which complete coordination or notification information, as appropriate, is received by the Radiocommunication Bureau after 1 January 2005 is subject to the application of the provisions of Nos. 9.12, 9.12A and 9.13. Resolution 610 (WRC-03) shall also apply."

¹¹⁹ *Above 28 MHz R&O* at paras. 31 and 33. Footnote US385 reads as follows: The band 1164-1215 MHz is also allocated to the radionavigation-satellite service (space-to-Earth, space-to-space) on a primary basis. In this band, stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical radionavigation service.

¹²⁰ Consequently, footnote US385 would be deleted.

international footnote 5.328A, which requires that RNSS stations in the band 1164-1215 MHz operate in accordance with Resolution 609 (WRC-03) and that they not claim protection from ARNS in the band 960-1215 MHz.

82. NTIA has informed us that it intends to limit Federal Government use of the RNSS (space-to-Earth) (space-to-space) allocation in the band 1215-1240 MHz through new footnote Gxxx, which would read as follows:¹²¹

Gxxx Use of the radionavigation-satellite service in the band 1215-1240 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under ITU Radio Regulation No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215-1240 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. ITU Radio Regulation No. 5.43 shall not apply in respect of the radiolocation service. ITU Resolution 608 (WRC-03) shall apply.

83. As indicated above, the band 1240-1300 MHz is allocated to the ARNS in the United States and Canada on a primary basis in footnote 5.334 and this international footnote has previously been added to the U.S. Table. At WRC-03, this ARNS allocation was moved to footnote 5.331, but its primary status was not explicitly restated. Therefore, we propose to remove this primary ARNS allocation in the band 1240-1300 MHz from deleted international footnote 5.334 and make it a table entry. We request comment on these proposals and on whether the RNSS allocation at 1215-1240 MHz, which is currently limited to Federal Government use, should be expanded to the band 1215-1300 MHz and made available for both Federal and non-Federal Government use. In this regard, we note that Lockheed Martin Corporation in 2001 filed a waiver with the Commission in order to use the band 1215-1240 MHz for its Regional Positioning System.¹²² If non-Federal Government entities demonstrate that they have RNSS requirements in the band 1215-1300 MHz, we will work closely with NTIA to determine if spectrum can be allocated for that purpose.

2. RNSS at 5000-5030 MHz

84. *Background.* The band 5000-5150 MHz is allocated to the ARNS and the aeronautical mobile-satellite (R) service (AMS(R)S) on a co-primary basis throughout the world.¹²³ Footnote 5.444 states that the band 5030-5150 MHz is to be used for the operation of the Microwave Landing System (MLS) for precision approach and landing of aircraft and that MLS requirements take precedence over other uses of this band.¹²⁴ However, the MLS currently operates only in the segment 5030-5091 MHz and the AMS(R)S allocation is unused.

85. Various segments of the band 5000-5150 MHz are allocated to other radiocommunication services on a worldwide basis. Specifically, the band 5000-5010 MHz is allocated to the RNSS

¹²¹ See NTIA WRC-03 Recommendations, Enclosure 1 at Agenda Item 1.15 and Enclosure 2 at p. 59. We note that since the band 1240-1300 MHz is not allocated to the RNSS in the United States, NTIA has created footnote Gxxx, which is based on footnote 5.329, except that footnote Gxxx applies only to the band 1215-1240 MHz, whereas footnote 5.329 applies to the band 1215-1300 MHz.

¹²² See Lockheed Martin Petition for Rule Making, received September 28, 2001; placed on public notice on November 15, 2001, in Rep. No. 2512, therein designated as RM-10331. Lockheed Martin stated that it currently provides the geostationary component of the Wide Area Augmentation System (WAAS) for demonstration purposes, and that it will be necessary for a commercial operator to obtain a license to build and deploy GPS augmentation broadcast satellites.

¹²³ The band 5000-5150 MHz is allocated to the AMS(R)S by footnote 5.367. 47 C.F.R. § 2.106, footnote 5.367.

¹²⁴ 47 C.F.R. § 2.106, footnote 5.444.

(Earth-to-space) on a primary basis (footnote 5.443A).¹²⁵ The band 5010-5030 MHz is allocated to the RNSS (space-to-Earth) (space-to-space) on a primary basis and this RNSS allocation is subject to technical limits to ensure that harmful interference is not caused to the MLS or the RAS in the adjacent 4990-5000 MHz band (footnote 5.443B).¹²⁶ The band 5091-5150 MHz is allocated to the FSS (Earth-to-space) on a primary basis and its use is limited to feeder links for NGSO MSS systems, subject to coordination and other regulatory requirements to protect RNSS and ARNS (footnote 5.444A).¹²⁷

86. In the United States, the band 5000-5150 MHz is allocated to the ARNS and the AMS(R)S on a co-primary basis for Federal and non-Federal Government use.¹²⁸ Aeronautical mobile communications which are an integral part of ARNS systems may also be performed in this band.¹²⁹ The band 5091-5150 MHz is allocated for NGSO MSS feeder links in accordance with footnote 5.444A. The MLS continues to take precedence over other uses of the band 5000-5150 MHz (footnote US370), instead of the segment 5030-5150 MHz (footnote 5.444), because the segment 5000-5030 MHz has not been allocated for RNSS use in the United States. In addition, the Commission provides guidance to NGSO MSS earth station operators to assist them in better protecting the MLS¹³⁰ and urges applicants for airborne or space station assignments to take all practicable steps to protect RAS observations in the band 4990-5000 MHz.¹³¹

¹²⁵ 47 C.F.R. § 2.106, footnote 5.443A.

¹²⁶ 47 C.F.R. § 2.106, footnote 5.443B, which states: *Additional allocation:* The band 5010-5030 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) (space-to-space) on a primary basis. In order not to cause harmful interference to the microwave landing system operating above 5030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5030-5150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5010-5030 MHz shall not exceed -124.5 dB(W/m²) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the band 4990-5000 MHz, the aggregate power flux-density produced in the 4990-5000 MHz band by all the space stations within any radionavigation-satellite service (space-to-Earth) system operating in the 5010-5030 MHz band shall not exceed the provisional value of -171 dB(W/m²) in a 10 MHz band at any radio astronomy observatory site for more than 2% of the time. For the use of this band, Resolution 604 (WRC-2000) applies.

¹²⁷ 47 C.F.R. § 2.106, footnote 5.444A, which states: *Additional allocation:* the band 5091-5150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems and is subject to coordination under No. 9.11A. In the band 5091-5150 MHz, the following conditions also apply: 1) prior to 1 January 2010, the use of the band 5091-5150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (WRC-95); 2) prior to 1 January 2010, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5000-5091 MHz band, shall take precedence over other uses of this band; 3) after 1 January 2008, no new assignments shall be made to stations providing feeder links of non-geostationary mobile-satellite systems; and 4) after 1 January 2010, the fixed-satellite service will become secondary to the aeronautical radionavigation service.

¹²⁸ The allocation to the AMS(R)S is found in international footnote 5.367, which has been added to the U.S. Table.

¹²⁹ 47 C.F.R. § 2.106, footnote US260.

¹³⁰ 47 C.F.R. § 2.106, footnote US344, which reads: In the band 5091-5250 MHz, non-Government earth stations in the fixed-satellite service (Earth-to-space) shall be coordinated through the Frequency Assignment Subcommittee (see Recommendation ITU-R S.1342). In order to better protect the operation of the international standard system (microwave landing system) in the band 5000-5091 MHz, non-Government tracking and telecommand operations should be conducted in the band 5150-5250 MHz.

¹³¹ 47 C.F.R. § 2.106, footnotes US211, US74. Footnote US211 goes on to state that footnote US74 applies. Thus, in the band 4990-5000 MHz, the RAS is protected from extraband radiation only to the extent that such radiation

(continued....)

87. At WRC-03, the primary RNSS (Earth-to-space) allocation in the band 5000-5010 MHz was removed from international footnote 5.443A and made a table entry and footnote 5.443A was suppressed. The primary RNSS (space-to-Earth) (space-to-space) allocation in the band 5010-5030 MHz was removed from international footnote 5.443B and made a table entry. Footnote 5.443B was modified to remove the RNSS allocation and to specify that RNSS systems must comply with the pfd limits in the band 4990-5000 MHz defined in Resolution 741. Those pfd limits are more stringent than the current provisional limit of -171 dB(W/m²) in a 10 megahertz band at any RAS site for no more than 2% of the time.¹³² Under Resolution 741, the pfd produced in the band 4990-5000 MHz by any GSO RNSS network operating in the band 5010-5030 MHz must not exceed the current limit at all times, that is, no 2% exception.¹³³ For NGSO RNSS networks, the limit is significantly tightened to -245 dB(W/m²) in a 10 megahertz band at any RAS site for no more than 2% of the time.

88. At WRC-03, footnote 5.444A was modified to extend the period during which NGSO MSS feeder links have primary status in the band 5091-5150 MHz by ten years, that is, to January 1, 2018.¹³⁴ After that date, NGSO MSS feeder links will become secondary to the ARNS. In addition, the period during which new assignments to NGSO MSS earth stations may be made was extended by four years to January 1, 2012. Finally, footnote 5.444 was modified to refer to Resolution 114, which was modified at WRC-03. Specifically, WRC-03 resolved that the ARNS and FSS allocations in the band 5091-5150 MHz should be reviewed at a future competent conference prior to 2018 and that studies should be undertaken on compatibility between new ARNS systems and NGSO MSS feeder links.

89. *Proposal.* Consistent with the *WRC-03 Final Acts*, we propose to allocate the band 5000-5030 MHz to the RNSS on a primary basis for Federal and non-Federal Government use. We further propose to limit the use of the segment 5000-5010 MHz to Earth-to-space transmissions and the segment 5010-5020 MHz to space-to-Earth and space-to-space transmissions. Consequently and also

(...continued from previous page)

exceeds the level which would be present if the offending station were operating in compliance with its technical rules

¹³² Modified footnote 5.443B reads as follows: “In order not to cause harmful interference to the microwave landing system operating above 5030 MHz, the aggregate power flux-density produced at the Earth’s surface in the band 5030-5150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5010-5030 MHz shall not exceed -124.5 dB(W/m²) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the band 4990-5000 MHz, radionavigation-satellite service systems operating in the band 5010-5030 MHz shall comply with the limits in the band 4990-5000 MHz defined in Resolution 741 (WRC-03).”

¹³³ See *WRC-03 Final Acts*, Resolution 741, *resolves* 1.

¹³⁴ Modified footnote 5.444A reads as follows: “*Additional allocation:* the band 5091-5150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A.

In the band 5091-5150 MHz, the following conditions also apply:

- prior to 1 January 2018, the use of the band 5091-5150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (Rev.WRC-03);
- prior to 1 January 2018, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5000-5091 MHz band, shall take precedence over other uses of this band;
- after 1 January 2012, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;
- after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service.”

because MLS does not operate in the band 5000-5030 MHz, we propose to replace footnote US370 with footnote 5.444, thereby removing the band 5000-5030 MHz from the spectrum in which MLS has precedence over other uses. In order to protect MLS operations above 5030 MHz and RAS observations in the band 4990-5000 MHz, we propose to limit the adjacent band pfd at the Earth's surface from RNSS operations in the band 5010-5030 MHz through the adoption of footnote 5.443B.¹³⁵ This action would align the band 5000-5030 MHz with international usage by providing 10 megahertz of spectrum for RNSS uplinks and 20 megahertz for RNSS downlinks and crosslinks. We seek comment on this proposal and information on future ARNS use of the band 5030-5150 MHz. Table 4, below, provides an overview of all of the RNSS proposals discussed in this section.

¹³⁵ See note 132, *supra*, for the text of revised footnote 5.443B.

Table 4: RNSS Proposals (Primary allocations are shown in capitals; secondary allocations are in normal characters, unless otherwise specified)

Band	International Allocations Prior to WRC-03	Existing U.S. Allocations	WRC-03 Final Acts	Proposed U.S. Allocations	Remarks
960-1215 MHz	ARNS 5.328 (ARNS use is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities) 5.328A (1164-1215 MHz is allocated to the RNSS (space-to-Earth) (space-to-space) on a primary basis; the aggregate pfd shall not exceed the provisional value of -115 dB (W/m ²) in any 1 MHz. RNSS shall not cause harmful interference (IX) to, nor claim protection from, ARNS)	ARNS 5.328 US385 (1164-1215 MHz is allocated to the RNSS (space-to-Earth, space-to-space) on a primary basis, but may not cause harmful IX to, nor claim protection from, ARNS.) ----- US224 (Federal systems utilizing spread spectrum techniques for terrestrial communication, navigation & identification may operate if IX not caused to ARNS.)	960-1164 MHz ARNS 5.328 1164-1215 MHz ARNS 5.328 RNSS (space-to-Earth)(space-to-space) 5.328A (RNSS cannot claim protection from ARNS in the band 960-1215 MHz) 5.328B (resolve intersystem technical compatibility issues on a bilateral basis until 2005)	960-1164 MHz ARNS 5.328 US224 1164-1215 MHz ARNS 5.328 RNSS (space-to-Earth) (space-to-space) 5.328A US224	No substantive change. Highlight the RNSS allocation by moving it from footnote US385 up as a table entry. Adopt 5.328A domestically.
1215-1240 MHz	RNSS (space-to-Earth) (space-to-space) 5.329 (RNSS downlinks must not cause IX to the radionavigation service (RNS)) 5.329A (RNSS (space-to-space) use in the band 1215-1300 MHz is not intended to provide safety service applications) EESS (active) & SRS (active) 5.332 (active spaceborne sensors in 1215-1260 MHz must not cause IX to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service, RNSS, & other primary services) RADIOLOCATION In certain Region 1 & 3 countries, 1215-1300 MHz is allocated on a primary basis to the fixed & mobile services (5.330) & RNS (5.331)	Federal RNSS (space-to-Earth) (space-to-space) Federal EESS (active) & SRS (active) 5.332 Federal RADIOLOCATION G56 (in the band 1215-1300 MHz, use is primarily for the military services) ----- Secondary non-Federal EESS (active) & SRS (active)	RNSS (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A EESS (active) & SRS (active) RADIOLOCATION 5.330 5.331 5.332	Federal RNSS (space-to-Earth) (space-to-space) Gxxx (RNSS must not cause harmful IX to, nor claim protection from, the ARNS and RNSS must not cause harmful interference to the radiolocation service.) Federal EESS (active) & SRS (active) 5.332 Federal RADIOLOCATION G56 ----- Secondary non-Federal EESS (active) & SRS (active)	Federal Government use of this RNSS allocation would be limited by requiring that incumbent services be protected.
1240-1300 MHz	RNSS (space-to-Earth) (space-to-space) 5.329 5.329A EESS (active) & SRS (active); active spaceborne sensors must not cause IX to, claim protection from, or otherwise impose constraints on operation or development of the (1) radiolocation service or primary services (5.335A); or (2) ARNS in the U.S. & Canada (5.335). RADIOLOCATION Amateur 5.282 (5650-5670 MHz is allocated for amateur-satellite uplinks) 5.330 5.331 5.332 5.334 (In U.S. & Canada, 1240-1300 MHz is allocated to ARNS on primary basis)	Federal EESS (active) & SRS (active) 5.332 5.335 Federal RADIOLOCATION G56 ----- 5.334 ----- Secondary non-Federal EESS (active) & SRS (active) Amateur 5.282	RNSS (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A EESS (active) & SRS (active) 5.335 5.335A RADIOLOCATION Amateur 5.282 (5650-5670 MHz is allocated for amateur-satellite uplinks) 5.330 5.332 5.331 (in certain nations, primary RNS in 1215-1300 MHz; in U.S. & Canada, 1240-1300 MHz allocated to ARNS)	Primary Federal EESS (active) & SRS (active) Federal RADIOLOCATION G56 ----- Federal & non-Federal ARNS ----- 5.332 5.335 ----- Secondary non-Federal EESS (active) & SRS (active) Amateur	Move ARNS allocation to a new United States footnote so that its primary status can be maintained.
5000-5150 MHz	ARNS 5.444 (5030-5150 MHz is to be used for microwave landing system (MLS)) 5.367 (5000-5150 MHz allocated for primary AMS(R)S) 5.443A (5000-5010 MHz is allocated to the RNSS (Earth-to-space) on a primary basis) 5.443B (5010-5030 MHz is allocated to the RNSS (space-to-Earth)(space-to-space) on a primary basis; provisional aggregate pfd limits established) 5.444A (5091-5150 MHz allocated for primary NGSO MSS feeder uplinks until 2010)	ARNS US260 (aeronautical mobile, integral to ARNS, permitted) US370 (5000-5150 MHz is to be used for MLS) 5.367 US211 (applicants urged to protect RAS) ----- 5.444A US344 (non-Federal tracking & telecommand should be conducted in 5150-5250 MHz)	5000-5010 MHz ARNS 5.367 RNSS (Earth-to-space) 5010-5030 MHz ARNS 5.367 RNSS (space-to-Earth) (space-to-space) 5.328B 5.443B 5030-5150 MHz ARNS 5.367 5.444 5.444A	5000-5010 MHz ARNS 5.367 US260 US344 RNSS (Earth-to-space) US211 5010-5030 MHz ARNS US260 US344 RNSS (space-to-Earth) (space-to-space) 5.443B 5.367 US211 5030-5150 MHz ARNS US260 5.367 5.444 5.444A US211 US344	Allocate 10 megahertz for RNSS uplinks. Allocate 20 megahertz for RNSS downlinks and crosslinks. Replace US370 with 5.444.

E. Little LEO Feeder Link Spectrum

90. *Background.* The band 1390-1392 MHz is allocated to the radiolocation service on a primary basis throughout the world, and it is also allocated to the fixed and mobile services on a co-primary basis in Region 1. The band is also allocated to the SRS (passive) and EESS (passive) on a secondary basis by footnote 5.339.¹³⁶ Further, footnote 5.149 urges administrations to take all practicable steps when assigning uses in the band 1330-1400 MHz, to protect the RAS from harmful interference.¹³⁷ Footnote 5.149 also stresses that emissions from spaceborne or airborne stations can be particularly serious sources of interference to the RAS.

91. The band 1430-1432 MHz is allocated to the fixed and mobile services on a co-primary basis throughout the world, except that the aeronautical mobile service is prohibited in Region 1. This band is also being used by some countries, including the United States, for passive research conducted in a program for the search for intentional emissions of extraterrestrial origin.¹³⁸ Finally, the band 1400-1427 MHz, which lies between the two bands at issue, is allocated worldwide for passive operations and footnote 5.340 prohibits the transmission of all emissions in the band 1400-1427 MHz on a worldwide basis.¹³⁹ Specifically, the band is allocated to the RAS, EESS (passive), and SRS (passive) on a co-primary basis throughout the world. The band 1400-1427 MHz is allocated to the RAS because the rest frequency of neutral hydrogen (HI) is at 1420.406 MHz and its observation is one of the radio-frequency lines of the greatest importance to radio astronomy.¹⁴⁰

92. In the United States, the bands 1390-1392 MHz and 1430-1432 MHz were reallocated in 2001 from Federal Government use to exclusive non-Federal Government use in the *27 Megahertz R&O*.¹⁴¹ In that action, the Commission provisionally allocated these bands to the FSS on a primary basis, with the use of the FSS allocation in the band 1390-1392 MHz limited to Earth-to-space transmissions and with the use of the FSS allocation in the band 1430-1432 MHz limited to space-to-Earth transmissions.¹⁴² The use of these FSS allocations are further limited to feeder links¹⁴³ for the Non-Voice NGSO MSS, which are generally known as Little LEOs, and is contingent on the adoption of similar

¹³⁶ 47 C.F.R. § 2.106, footnote 5.339.

¹³⁷ 47 C.F.R. § 2.106, footnote 5.149.

¹³⁸ 47 C.F.R. § 2.106, footnote 5.341.

¹³⁹ 47 C.F.R. § 2.106, footnote 5.340. In the United States, we interpret this international requirement as no station may transmit in the band 1400-1427 MHz. 47 C.F.R. § 2.106, footnote US246.

¹⁴⁰ See *ITU Handbook on Radio Astronomy*, Radiocommunication Bureau, Geneva, 1995 at page 13.

¹⁴¹ *Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands*, ET Docket No. 00-221, *Report and Order and Memorandum Opinion and Order*, 17 FCC Rcd 368 (2002) (*27 Megahertz R&O*).

¹⁴² Specifically, we added primary FSS allocations as table entries in the bands 1390-1392 MHz (Earth-to-space) and 1430-1432 (space-to-Earth) and adopted footnote US368. Because satellites are power limited, the downlink allocation is normally in the lower band. However, at the request of CORF, we switched the directional indicators in order to protect RAS observations in the band 1350-1400 MHz. See *27 Megahertz R&O* at para. 52.

¹⁴³ A feeder link is defined as a radio link from an earth station at a given location to a space station, or vice versa, conveying information for a radiocommunication service other than for the FSS. The given location may be at a specified fixed point, or at any fixed point within specified areas. 47 C.F.R. § 2.1. Thus, in the case of Little LEOs, a dedicated feeder link allocation would free up spectrum for service link use. A service link is a radio link from a subscriber unit to a space station, or vice versa.

international allocations.¹⁴⁴ In addition, the domestic Little LEO feeder link allocation was contingent on the completion of spectrum sharing studies, as well as other coordination and technical limitations as spelled out in footnote US368.¹⁴⁵

93. In the *27 Megahertz R&O*, the Commission also allocated the band 1390-1392 MHz to the fixed and mobile except aeronautical mobile services on a co-primary basis with the provisional FSS uplink allocation. The band 1390-1392 MHz was made available for use on an unpaired basis. The Commission revised footnote US311 to take note of the fact that RAS observations are made in the band 1350-1400 MHz on an unprotected basis at 16 sites.¹⁴⁶ The Commission maintained the primary land mobile service allocation in the band 1430-1432 MHz, shifted the Wireless Medical Telemetry Service (WMTS) out of this spectrum, except that WMTS operations in seven cities will continue to operate in the segment 1430-1431.5 MHz,¹⁴⁷ and otherwise made this band available for commercial telemetry use, such as meter reading. The secondary fixed service allocation, which is limited to telemetry uses, in the band 1430-1432 MHz was raised to primary status.

94. The international primary passive allocations for the RAS, EESS, and SRS in the band 1400-1427 MHz have been adopted domestically. However, rather than adopting footnote 5.149 regarding protection of passive operations, the Commission adopted footnote US74, which states that the RAS in the band 1400-1427 MHz shall be protected from extraband radiation only to the extent that such radiation exceeds the level permitted for a properly operated station.¹⁴⁸

95. At WRC-03, the United States was able to garner conditional support for a worldwide secondary allocation for Little LEO feeder links. Specifically, WRC-03 adopted footnote 5.339A, which provides for secondary FSS allocations at 1390-1392 MHz for Earth-to-space transmissions and at

¹⁴⁴ Little LEOs (Low Earth Orbit satellites), which operate under MSS allocations, are prohibited from providing voice services and from operating in the geostationary orbit. In the Commission's Rules, 1.85 megahertz of spectrum has been designated for use by Little LEO downlinks (137-138 MHz and 400.15-401 MHz) and 2.2 megahertz of spectrum has been designated as being available for use by Little LEO uplinks (148-150.05 MHz and 399.9-400.05 MHz). 47 C.F.R. § 25.202(a)(3). Currently, Little LEO spectrum must be used for both service links and feeder links. At this time, ORBCOMM LLC and Volunteers in Technical Assistance, Inc. (VITA) are providing service using Little LEO spectrum.

¹⁴⁵ Footnote US368 reads as follows: "The band 1390-1392 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis and the band 1430-1432 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to feeder links for the Non-Voice Non-Geostationary Mobile-Satellite Service, and contingent on (1) the completion of sharing studies including the measurement of emissions from equipment that would be employed in operational systems and demonstrations to validate the studies as called for in Resolution 127 (WRC-2000), (2) the adoption of worldwide feeder link allocations at the 2003 World Radiocommunication Conference (WRC-03), and (3) compliance with any technical and operational requirements that may be imposed at WRC-03 to protect passive services in the 1400-1427 MHz band from unwanted emissions associated with such allocations. These allocations become effective upon adoption of worldwide allocations at WRC-03. If no such allocations are adopted by WRC-03, these allocations shall be considered null and void, with no grandfathering of rights. Individual assignments shall be coordinated with the Interdepartmental Radio Advisory Committee's (IRAC) Frequency Assignment Subcommittee (FAS) (see, for example, Recommendations ITU-R RA.769-1 and ITU R SA.1029-1) to ensure the protection of passive services in the 1400-1427 MHz band. Coordination shall not be completed until the feeder downlink system is tested and certified to be in conformance with the technical and operational requirements for the protection of passive services in the 1400-1427 MHz band. Certification and all supporting documentation shall be submitted to the Commission and FAS prior to launch."

¹⁴⁶ 47 C.F.R. § 2.106, footnote US311.

¹⁴⁷ 47 C.F.R. § 2.106, footnote US350.

¹⁴⁸ 47 C.F.R. § 2.106, footnote US74.

1430-1432 MHz for space-to-Earth transmissions for Little LEO operations, subject to Resolution 745.¹⁴⁹ In Resolution 745, WRC-03 resolves that the Little LEO feeder link allocations “shall not be used until the completion of ITU-R studies on all identified compatibility issues as shown in Annex 1 of this Resolution and the results of these studies shall be reported to WRC-07 [World Radiocommunication Conference, 2007] and the decisions should be taken by WRC-07 accordingly.”¹⁵⁰

96. *Proposal.* While WRC-03 allocated spectrum for Little LEO feeder links on a secondary basis throughout the world, WRC-03 resolved that use of these allocations is contingent on the subsequent completion of ITU-R spectrum sharing studies to determine the impact of these NGSO FSS operations on incumbent services, including passive service operations in the adjacent band 1400-1427 MHz. Furthermore, Resolution 745 indicates that any Little LEO use of these bands is subject to additional decisions on compatibility issues that may be adopted at WRC-07.¹⁵¹

97. Given the differences between US368 and the decision made at WRC-03, we are reconsidering this conditional allocation herein to conform to the WRC-03 allocation. We tentatively conclude that the best way forward is to implement WRC-03’s decision regarding Little LEO feeder links. We continue to recognize that it is important for sharing studies for these bands to be successfully completed.¹⁵² We tentatively find that replacing footnote US368 with 5.339A is insufficient for our needs. Instead, we propose to maintain footnote US368 in a modified form that recognizes the actions taken at WRC-03. Specifically, we propose the following actions: First, we would downgrade the provisional Little LEO feeder link allocations from primary to secondary status. Second, we would require the completion of ITU-R studies on all identified compatibility issues as shown in Annex 1 of Resolution 745 (WRC-2003). Third, we would make any use of the worldwide feeder links subject to any further compatibility decisions by WRC-07. Accordingly, we propose to amend the Table entries for the FSS uplink allocation in the band 1390-1392 MHz and the FSS downlink allocation in the band 1430-1432 MHz to show secondary status in lieu of primary status, and to revise footnote US368 to read as follows:

US368 The use of the bands 1390-1392 MHz and 1430-1432 MHz by the fixed-satellite service is limited to feeder links for the Non-Voice Non-Geostationary Mobile-Satellite Service and is contingent on (1) the completion of ITU-R studies on all identified compatibility issues as shown in Annex 1 of Resolution 745 (WRC-2003); (2) measurement of emissions from equipment that would be employed in operational systems and demonstrations to validate the studies as called for in Resolution 745 (WRC-2003); and (3) compliance with any technical and operational requirements that may be imposed at WRC-07 to protect other services in these bands and passive services in the band 1400-1427 MHz from unwanted emissions. Individual assignments shall be coordinated with the Interdepartment Radio Advisory Committee’s (IRAC) Frequency Assignment Subcommittee (FAS) (see, for example, Recommendations ITU-R RA.769-1 and ITU-R SA.1029-1) to ensure the protection of passive services in the band 1400-1427 MHz. Coordination shall not be completed until the feeder uplink and downlink systems are tested and certified to be in conformance with the technical and operational requirements for the protection of passive services in the band 1400-1427

¹⁴⁹ Footnote 5.339A reads as follows: “*Additional allocation:* the band 1390-1392 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a secondary basis and the band 1430-1432 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis. These allocations are limited to use for feeder links for non-geostationary-satellite networks in the mobile-satellite service with service links below 1 GHz, and Resolution 745 (WRC-03) applies.”

¹⁵⁰ See *WRC-03 Final Acts* at Resolution 745 (Protection of existing services in all Regions from non-geostationary-satellite networks in the fixed-satellite service using the frequency bands around 1.4 GHz on a secondary basis), *resolves* 1.

¹⁵¹ *Ibid.*, *resolves* 2.

¹⁵² See para. 95, *supra*.

MHz. Certification and all supporting documentation shall be submitted to the Commission and the FAS prior to launch.

98. Further, any Little LEO application for use of these bands will be subject to the outcome of this rule making. The Commission would review the results of any studies and measurements of emissions from equipment that would be employed in operational systems and demonstrations to validate the studies. The Commission would decide what technical and operational requirements to impose to protect other services, and individual assignments would be coordinated with the FAS to ensure the protection of passive services in the band 1400-1427 MHz. Any further decisions taken by WRC-07 would be considered by the Commission once they are final. We request comment on these proposals.

F. Radiolocation Upgrade in the Band 2900-3100 MHz

99. *Background.* The band 2900-3100 MHz is allocated to the radionavigation service on a primary basis throughout the world, with ARNS use limited to ground-based radars.¹⁵³ In addition, prior to WRC-03, the band 2900-3100 MHz was allocated to the radiolocation service on a secondary basis throughout the world. In the band 2900-3100 MHz, the use of the shipborne interrogator-transponder system is limited to the sub-band 2930-2950 MHz,¹⁵⁴ and international footnote 5.427 requires that the response from radar transponders must not be capable of being confused with the response from radar beacons (racons) and must not cause interference to ship or aeronautical radars in the radionavigation service.¹⁵⁵

100. In the United States, the band 2900-3100 MHz is allocated to the maritime radionavigation service on a primary basis and to the radiolocation service on a secondary basis for Federal and non-Federal Government use. This band is primarily used for maritime radars and radar beacons (racons). Radars of this type are required on cargo and passenger ships by international treaty (SOLAS) for safety purposes. Racons operate in conjunction with maritime radars to provide electronic markers to identify maritime obstructions and navigation points.¹⁵⁶

101. Federal Government use of the secondary radiolocation service allocation is primarily for the military services, except that limited use is permitted for survey operations and in support of experimentation and research programs.¹⁵⁷ International footnote 5.427, described above, has been adopted domestically. The radiolocation service may be authorized for non-Federal Government use on the condition that no harmful interference is caused to Federal Government operations.¹⁵⁸ The band 2900-3000 MHz is also allocated on a primary basis to the meteorological aids service for Federal Government use and operations in this service are limited to Next Generation Weather Radar (NEXRAD) systems where accommodation in the band 2700-2900 MHz is not technically practical.¹⁵⁹

¹⁵³ 47 C.F.R. § 2.106, footnote 5.426.

¹⁵⁴ 47 C.F.R. § 2.106, footnote 5.425.

¹⁵⁵ 47 C.F.R. § 2.106, footnote 5.427. This international footnote provides an exception by referencing ITU Radio Regulation 4.9 (no provision of these Regulations prevents the use by a station in distress, or by a station providing assistance to it, of any means of radiocommunication at its disposal...).

¹⁵⁶ See <http://www.tscm.com/nebbia4.html>.

¹⁵⁷ 47 C.F.R. § 2.106, footnote G56.

¹⁵⁸ 47 C.F.R. § 2.106, footnote US44.

¹⁵⁹ 47 C.F.R. § 2.106, footnote US316.

102. At WRC-03, the secondary allocation to the radiolocation service in the band 2900-3100 MHz was upgraded to primary status. WRC-03 also adopted footnote 5.424A, which requires that radiolocation operations protect and not hinder radionavigation services.¹⁶⁰

103. NTIA requests that the Federal Government's secondary allocation for the radiolocation service in the band 2900-3100 MHz be upgraded to primary status and that the incumbent radionavigation service be protected from the new co-primary radiolocation service through the adoption of footnote 5.424A in the Federal Government Table.¹⁶¹

104. *Proposal.* We propose to upgrade the Federal Government's radiolocation service allocation in the band 2900-3100 MHz to primary status and to add international footnote 5.424A to the Federal Government Table to protect important ship navigation systems. As described in more detail in the *U.S. Proposal for WRC-03*, radionavigation radars operating in the band 2900-3100 MHz have demonstrated compatible operations with radiolocation systems, mainly as a result of newer radar design features that mitigate received radar-to-radar interference.¹⁶² We believe that this action would increase the usefulness of this band without causing any burden on existing operations. We request comment on this proposal and on whether the secondary non-Federal Government radiolocation service allocation should also be upgraded to primary status.

G. Terms, Definitions, and Editorial Amendments

105. In order to reflect additions and revisions to the terms and definitions listed in the ITU *Radio Regulations* and in the *WRC-03 Final Acts*, we propose to amend Section 2.1 of the Commission's Rules¹⁶³ to: (1) add definitions for adaptive system and high altitude platform station (HAPS); (2) revise the definitions for coordinated universal time (UTC), coordination area, coordination distance, facsimile, geostationary satellite, harmful interference, inclination of an orbit of an earth satellite, telegraphy, and telephony; and (3) make minor editorial modifications to the definitions for administration, broadcasting service, mobile service, permissible interference, power, public correspondence, radio, radiocommunication, safety service, semi-duplex operation, telecommunication, and telegram. We would also correct a typographical error in the definition for telemetry. The UTC definition would also be revised in Part 73. The definitions of these terms are shown in Appendix A.

106. We also propose to take the following non-substantive actions in this proceeding, which would correct and update Section 2.106 of the Commission's Rules, the Table of Frequency Allocations (Table).¹⁶⁴ The effect of these actions would be to reflect the *WRC-03 Final Acts* with regard to the International Table within our Rules (columns 1-3 of the Table), to remove confusing and unnecessary material from the U.S. Table (columns 4 and 5 of the Table), and to add rule part cross references in column 6 of the Table for the frequency bands where they are missing. Specifically, we would revise the

¹⁶⁰ Footnote 5.424A reads as follows: "In the band 2900-3100 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the radionavigation service."

¹⁶¹ See NTIA WRC-03 Recommendations, Enclosure 1 at Agenda Item 1.17 and Enclosure 2 at p. 20.

¹⁶² See *U.S. Proposal for WRC-03*, Agenda Item 1.17, at pages 60-61.

¹⁶³ 47 C.F.R. § 2.1. Terms and definitions listed in Section 2.1 are the definitive terms and definitions that prevail throughout the Commission's Rules.

¹⁶⁴ 47 C.F.R. § 2.106.

table entries in the International Table and the list of International Footnotes to reflect the *WRC-03 Final Acts* in those frequency bands not otherwise discussed herein.¹⁶⁵

107. In the U.S. Table, we propose to take six actions. First, we would delete footnote US238 from our Rules because the transition period has expired. This action means that Federal Government stations would no longer be permitted to operate in the band 1605-1705 kHz (AM Expanded Band). Second, we would delete footnote NG129 because there are no fixed stations in Alaska listed in our licensing database for the band 76-100 MHz. Consequently, we would also delete Sections 73.220(b) and 73.603(b) from our Rules. Third, we would delete footnote NG151 because licensees in the Cellular Radiotelephone Service have previously be authorized to provide fixed service on a primary basis and thus, there is no longer need for separate authority to provide auxiliary services on a secondary basis. Fourth, we would revise footnote US352 to delete the 14 sites in the band 1427-1432 MHz at which Federal operations have operated on a fully protected basis because the transition period has expired. Fifth, we would delete footnote NG176 because the fixed and mobile service allocations in the band 1710-1755 MHz, which will auctioned for use by Advanced Wireless Services (AWS), are now effective. Sixth, we would delete footnote US264 from the band 47.2-48.2 GHz in the non-Federal Government Table because the footnote does not apply to this band.

108. In the FCC Rule Part(s) column, we would add cross references to Part 90 in the bands 4750-4995 kHz, 5730-5900 kHz, 6765-7000 kHz, 9040-9400 kHz, 9900-9995 kHz, 10150-11175 kHz, 11400-11600 kHz, 12100-12230 kHz, 13410-13570 kHz, 13870-14000 kHz, 14350-14990 kHz, 15800-16350 KHz, 17410-17480 kHz, 18030-18068 kHz, 18168-18780 kHz, 19020-19680 kHz, 19800-19990 kHz, 20010-21000 kHz, 21850-21924 kHz, 22855-23200 kHz, and 23350-24890 kHz;¹⁶⁶

¹⁶⁵ The International Table is included in our Rules for informational purposes only. 47 C.F.R. § 2.104(a). Using the *Provisional WRC-03 Final Acts*, we have previously taken the following actions with regard to international footnotes: (1) added footnotes 5.197A and 5.328B in the *Aviation R&O*; (2) added footnotes 5.457A, 5.457B, 5.504A, 5.504B, 5.504C, 5.506A, 5.506B, 5.508A, and 5.509A in the *Above 28 MHz R&O*; (3) revised footnotes 5.447, 5.448, 5.448A, 5.448B, 5.450, 5.453, 5.454, and 5.455; and added footnotes 5.446A, 5.446B, 5.447E, 5.447F, 5.448C, 5.448D, 5.450A, and 5.450B in the *5 GHz R&O*; and (4) revised footnotes 5.340, 5.547, and 5.555A; added footnotes 5.516B, 5.551H, 5.551I, and 5.554A; and removed footnotes 5.551AA and 5.551G in the *V-band Second R&O*. Subsequently, the ITU has completed its review and editing of the *Provisional WRC-03 Final Acts* and has published the *WRC-03 Final Acts*. Our staff has reviewed the *WRC-03 Final Acts* and has herein provided the needed updates to the International Table, including minor changes to the text of some of the above international footnotes. Consequently, we would herein revise the text of footnotes 5.447E, 5.453, 5.454, 5.455, 5.504C, 5.506A, 5.506B, 5.508A, 5.509A, 5.516B, and 5.551I in our Rules to comport with the *WRC-03 Final Acts*. In addition, the text of footnote 5.555B has been inadvertently associated with footnote number 5.555A. We would herein delete footnote 5.555A from our Rules and add footnote 5.555B.

¹⁶⁶ The above frequency bands are listed in a corrected *Public Notice* titled “2-25 MHz HF Frequency Bands Available for Part 90 Long Distance Communications,” dated August 12, 1988. These bands are available for qualified Part 90 users for operations under Section 90.266. While the WARC-92 HFBC bands are also listed in this *Public Notice*, we decline to add Part 90 cross references to these bands because after April 1, 2007, incumbent fixed and land mobile use will be authorized on the condition that harmful interference is not caused to the HFBC service and because new fixed and/or land mobile use will not be authorized. In addition, a *Public Notice* titled “Local Government Radio Service 2 to 10 MHz Frequency List” states that certain of the frequencies within the bands 2194-2495 kHz, 2505-2850 kHz, 5005-5450 kHz, and 7400-8100 kHz are available for use in accordance with Section 90.264. 47 C.F.R. §§ 90.264, 90.266.

Part 25 in the band 399.9-400.05 MHz;¹⁶⁷ and Part 27 in the bands 1710-1755 MHz and 2110-2155 MHz.¹⁶⁸ These proposals are shown in Appendix A.

IV. PROCEDURAL MATTERS

A. Initial Regulatory Flexibility Analysis

109. As required by Section 603 of the Regulatory Flexibility Act, 5 U.S.C. § 603, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the proposals suggested in this document. The IRFA is set forth in Appendix B. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines as comments filed in this *Notice of Proposed Rule Making (Omnibus NPRM)* provided below in Section IV.C. Comments must have a separate and distinct heading designating them as responses to the IRFA.

B. *Ex Parte* Rules – Permit-But-Disclose Proceeding

110. This is a permit-but-disclose notice and comment rule making proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in the Commission's rules. *See generally* 47 C.F.R. §§ 1.1202, 1.1203, and 1.2306(a).

C. Comments

111. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments on or before **30 days from date of publication in the Federal Register**, and reply comments on or before **45 days from date of publication in the Federal Register**. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies. *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24121 (1998).

112. Comments filed through the ECFS can be sent as an electronic file via the Internet to <http://www.fcc.gov/e-file/ecfs.html>. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form <your e-mail address.>" A sample form and directions will be sent in reply. Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number.

113. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). The Commission's contractor, Natek, Inc., will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, N.E.,

¹⁶⁷ 47 C.F.R. § 25.202(a)(3).

¹⁶⁸ These bands have recently been added to Part 27 of the Commission's Rules. *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 02-353, *Report and Order*, 18 FCC Rcd 25162 (2003).

Suite 110, Washington, D.C. 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class mail, Express Mail, and Priority Mail should be addressed to 445 12th Street, SW, Washington, D.C. 20554. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

D. Contact Person

114. For further information concerning this rule making proceeding contact Tom Mooring of the Office of Engineering and Technology at (202) 418-2450, Tom.Mooring@fcc.gov.

V. ORDERING CLAUSES

115. Accordingly, IT IS ORDERED that pursuant to Sections 1, 4(i), 7(a), 301, 302(a), 303(f), 303(g), 303(r), 307, 308, 309(j), 316, 332, 334, and 336 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154(i), 157(a), 301, 302(a), 303(f), 303(g), 303(r), 307, 308, 309(j), 316, 332, 334, and 336, the NOTICE OF PROPOSED RULEMAKING is hereby ADOPTED.

116. IT IS FURTHER ORDERED that the Commission's Consumer Information and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this NOTICE OF PROPOSED RULEMAKING, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

Appendix A: Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 C.F.R. parts 2, 25, and 73 as follows:

**PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;
GENERAL RULES AND REGULATIONS**

1. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Paragraph 2.1(b) is amended to read as follows and paragraph 2.1(c) is amended by adding and revising the following terms in alphabetical order to read as follows:

§ 2.1 Terms and definitions.

(a) * * *

(b) The source of each definition is indicated as follows:

CS--Annex to the Constitution of the International Telecommunication Union (ITU).

CV--Annex to the Convention of the ITU.

FCC--Federal Communications Commission.

RR--ITU Radio Regulations.

(c) The following terms and definitions are issued:

* * * * *

Adaptive System. A radiocommunication system which varies its radio characteristics according to channel quality. (RR)

Administration. Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations. (CS)

* * * * *

Broadcasting Service. A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission. (CS)

* * * * *

Coordinated Universal Time (UTC). Time scale, based on the second (SI), as defined in Recommendation ITU-R TF.460-6. (RR)

Coordination Area. When determining the need for coordination, the area surrounding an earth station sharing the same frequency band with terrestrial stations, or surrounding a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

* * * * *

Coordination Distance. When determining the need for coordination, the distance on a given azimuth from an earth station sharing the same frequency band with terrestrial stations, or from a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

* * * * *

Facsimile. A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. (RR)

* * * * *

Geostationary Satellite. A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a geosynchronous satellite which remains approximately fixed relative to the Earth. (RR)

* * * * *

Harmful Interference. Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the ITU] Radio Regulations. (CS)

High Altitude Platform Station (HAPS). A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth. (RR)

* * * * *

Inclination of an Orbit (of an earth satellite). The angle determined by the plane containing the orbit and the plane of the Earth's equator measured in degrees between 0° and 180° and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the orbit. (RR)

* * * * *

Mobile Service. A radiocommunication service between mobile and land stations, or between mobile stations. (CV)

* * * * *

Permissible Interference.¹ Observed or predicted interference which complies with quantitative interference and sharing criteria contained in these [ITU Radio] Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations. (RR)

* * * * *

Power. Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, according to the class of emission, using the arbitrary symbols indicated:

- peak envelope power (PX or pX);
- mean power (PY or pY);
- carrier power (PZ or pZ).

Note 1: For different classes of emission, the relationships between peak envelope power, mean power and carrier power, under the conditions of normal operation and of no modulation, are contained in ITU-R Recommendations which may be used as a guide.

Note 2: For use in formulae, the symbol p denotes power expressed in watts and the symbol P denotes power expressed in decibels relative to a reference level. (RR)

* * * * *

Public Correspondence. Any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission. (CS)

* * * * *

Radio. A general term applied to the use of radio waves. (RR)

* * * * *

¹ See footnote under Accepted Interference.

Radiocommunication. Telecommunication by means of radio waves. (CS) (CV)

* * * * *

Safety Service. Any radiocommunication service used permanently or temporarily for the safeguarding of human life and property. (RR)

* * * * *

Semi-Duplex Operation. A method which is simplex operation on one end of the circuit and duplex operation at the other.⁴ (RR)

Telecommunication. Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems. (CS)

* * * * *

Telegram. Written matter intended to be transmitted by telegraphy for delivery to the addressee. This term also includes radiotelegrams unless otherwise specified. (CS)

Note: In this definition the term telegraphy has the same general meaning as defined in the Convention.

Telegraphy.⁶ A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use. (CS)

Telemetry. The use of telecommunication for automatically indicating or recording measurements at a distance from the measuring instrument. (RR)

Telephony. A form of telecommunication primarily intended for the exchange of information in the form of speech. (CS)

* * * * *

3. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise pages 5, 10-19, 26, 32, 33, 35, 36, 38, 39, 41-49, 52-61, 64-70, 72, 73, 75, 78, and 79.

b. In the list of International footnotes, revise footnotes 5.56, 5.68, 5.70, 5.87, 5.96, 5.98, 5.99, 5.107, 5.112, 5.114, 5.117, 5.118, 5.134, 5.139, 5.140, 5.142, 5.152, 5.154, 5.155, 5.163, 5.164, 5.174, 5.177, 5.179, 5.181, 5.203B, 5.204, 5.210, 5.212, 5.221, 5.237, 5.254, 5.262, 5.271, 5.273, 5.277, 5.288, 5.294, 5.296, 5.311, 5.312, 5.316, 5.323, 5.328A, 5.329, 5.330, 5.331, 5.334, 5.338, 5.347, 5.348, 5.348A, 5.355, 5.359, 5.362B, 5.369, 5.381, 5.382, 5.386, 5.387, 5.388A, 5.395, 5.400, 5.416, 5.418, 5.418A, 5.418B, 5.418C, 5.422, 5.428, 5.429, 5.430, 5.431, 5.443B, 5.444, 5.444A, 5.447E, 5.453, 5.454, 5.455, 5.456, 5.460, 5.466, 5.468, 5.469, 5.473, 5.477, 5.478, 5.481, 5.482, 5.483, 5.487, 5.487A, 5.488, 5.494, 5.495, 5.500, 5.501, 5.502, 5.503, 5.504C, 5.505, 5.506A, 5.506B, 5.508, 5.508A, 5.509A, 5.512, 5.514, 5.516B, 5.521, 5.536A, 5.537A, 5.543A, 5.545, 5.546, 5.547C, 5.548, 5.549, 5.550, and 5.551I; add footnotes 5.138A, 5.141A, 5.141B, 5.141C, 5.143A, 5.143B, 5.143C, 5.143D, 5.143E, 5.256A, 5.279A, 5.339A, 5.347A, 5.348B, 5.348C, 5.379B, 5.379C, 5.379D, 5.379E, 5.380A, 5.388B, 5.418AA, 5.418AB, 5.418AC, 5.418AD, 5.424A, 5.516A, 5.536C, 5.549A, and 5.555B; and remove footnotes 5.377, 5.389D, 5.421, 5.443A, 5.467, 5.491, 5.503A, 5.534, 5.551A, and 5.555A.

c. In the list of United States (US) footnotes, remove footnotes US238, US370, and US385; revise footnotes US252, US258, US262, US310, US352, US366, and US368; and add footnotes USxxx, USyyy, and USzzz.

d. In the list of non-Federal Government (NG) footnotes, remove footnotes NG129, NG151, and NG176.

⁴ See footnote under Duplex Operations.

⁶ A graphic document records information in a permanent form and is capable of being filed and consulted; it may take the form of written or printed matter or of a fixed image.

e. In the list of Federal Government (G) footnotes, add footnotes Gxxx and Gyyy.

§ 2.106 Table of Frequency Allocations.

The revisions and additions read as follows:

* * * * *

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	505-510 MARITIME MOBILE 5.79	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Land mobile	505-510 MARITIME MOBILE 5.79		Maritime (80)
	510-525 MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION		510-525 MARITIME MOBILE (ships only) 5.79A 5.84 AERONAUTICAL RADIONAVIGATION (radiobeacons) US18 US14 US225		Maritime (80) Aviation (87)
	525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION		525-535 AERONAUTICAL RADIONAVIGATION (radiobeacons) US18 MOBILE US221		Aviation (87) Private Land Mobile (90)
5.72 526.5-1606.5 BROADCASTING		526.5-535 BROADCASTING Mobile 5.88	US239		
	535-1605 BROADCASTING	535-1606.5 BROADCASTING	535-1605 US321	535-1605 BROADCASTING US321 NG128	Radio Broadcast (AM) (73) Auxiliary Broadcast (74) Alaska Fixed (80)
5.87 5.87A 1606.5-1625 FIXED MARITIME MOBILE 5.90 LAND MOBILE	1605-1625 BROADCASTING 5.89	1606.5-1800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION	1605-1615 MOBILE US221 US321	1605-1705 BROADCASTING 5.89	
5.92 1625-1635 RADIOLOCATION	5.90		1615-1705		
5.93 1635-1800 FIXED MARITIME MOBILE 5.90 LAND MOBILE	1625-1705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90		US299 US321		

4438-4650 FIXED MOBILE except aeronautical mobile (R)		4438-4650 FIXED MOBILE except aeronautical mobile	4438-4650 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Aviation (87) Private Land Mobile (90)
4650-4700 AERONAUTICAL MOBILE (R)			4650-4700 AERONAUTICAL MOBILE (R) US282 US283 US340		Aviation (87)
4700-4750 AERONAUTICAL MOBILE (OR)			4700-4750 AERONAUTICAL MOBILE (OR) US340		
4750-4850 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	4750-4850 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	4750-4850 FIXED BROADCASTING 5.113 Land mobile	4750-4850 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Private Land Mobile (90)
4850-4995 FIXED LAND MOBILE BROADCASTING 5.113			4850-4995 FIXED MOBILE US340	4850-4995 FIXED US340	Aviation (87) Private Land Mobile (90)
4995-5003 STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)			4995-5003 STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz) US340		
5003-5005 STANDARD FREQUENCY AND TIME SIGNAL Space research			5003-5005 STANDARD FREQUENCY AND TIME SIGNAL US340 G106	5003-5005 STANDARD FREQUENCY AND TIME SIGNAL US340	
5005-5060 FIXED BROADCASTING 5.113			5005-5060 FIXED US340		Maritime (80) Aviation (87) Private Land Mobile (90)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
5060-5250 FIXED Mobile except aeronautical mobile 5.133			5060-5450 FIXED Mobile except aeronautical mobile US212 US340 US381		Maritime (80) Aviation (87) Private Land Mobile (90) Amateur (97)
5250-5450 FIXED MOBILE except aeronautical mobile					
5450-5480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5450-5480 AERONAUTICAL MOBILE (R)	5450-5480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5450-5680 AERONAUTICAL MOBILE (R) 5.111 5.115 US283 US340		Aviation (87)
5480-5680 AERONAUTICAL MOBILE (R) 5.111 5.115					
5680-5730 AERONAUTICAL MOBILE (OR) 5.111 5.115			5680-5730 AERONAUTICAL MOBILE (OR) 5.111 5.115 US340		
5730-5900 FIXED LAND MOBILE	5730-5900 FIXED MOBILE except aeronautical mobile (R)	5730-5900 FIXED Mobile except aeronautical mobile (R)	5730-5900 FIXED MOBILE except aeronautical mobile (R) US340		Maritime (80) Aviation (87) Private Land Mobile (90)
5900-5950 BROADCASTING 5.134 5.136			5900-5950 BROADCASTING 5.134 FIXED MOBILE except aeronautical mobile (R) US340 US366		Radio Broadcast (HF) (73) Maritime (80) Aviation (87)
5950-6200 BROADCASTING			5950-6200 BROADCASTING US340		Radio Broadcast (HF) (73)
6200-6525 MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137			6200-6525 MARITIME MOBILE 5.109 5.110 5.130 5.132 US82 US296 US340		Maritime (80)
6525-6685 AERONAUTICAL MOBILE (R)			6525-6685 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)

6685-6765 AERONAUTICAL MOBILE (OR)			6685-6765 AERONAUTICAL MOBILE (OR) US340	
6765-7000 FIXED MOBILE except aeronautical mobile (R) 5.138 5.138A 5.139			6765-7000 FIXED MOBILE except aeronautical mobile (R) 5.138 US340 USxxx	ISM Equipment (18) Private Land Mobile (90)
7000-7100 AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A			7000-7100 US340	Amateur (97)
7100-7200 AMATEUR 5.141A 5.141B 5.141C 5.142			7000-7100 AMATEUR AMATEUR-SATELLITE US340	
7200-7300 BROADCASTING	7200-7300 AMATEUR 5.142	7200-7300 BROADCASTING	7100-7300 AMATEUR 5.142 US340	
7300-7400 BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D			7300-7400 BROADCASTING 5.134 5.143D US340 USyyy	Radio Broadcast (HF) (73) Maritime (80) Private Land Mobile (90)
7400-7450 BROADCASTING 5.143B 5.143C	7400-7450 FIXED MOBILE except aeronautical mobile (R)	7400-7450 BROADCASTING 5.143A 5.143C	7400-8100 FIXED MOBILE except aeronautical mobile (R) US340	Maritime (80) Aviation (87) Private Land Mobile (90)
7450-8100 FIXED MOBILE except aeronautical mobile (R) 5.143E 5.144				
8100-8195 FIXED MARITIME MOBILE				
8195-8815 MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111			8100-8195 FIXED MARITIME MOBILE US340	Maritime (80)
8815-8965 AERONAUTICAL MOBILE (R)			8195-8815 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 5.111 US296 US340	Maritime (80) Aviation (87)
8815-8965 AERONAUTICAL MOBILE (R)			8815-8965 AERONAUTICAL MOBILE (R) US340	Aviation (87)
8965-9040 AERONAUTICAL MOBILE (OR)			8965-9040 AERONAUTICAL MOBILE (OR) US340	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
9040-9400 FIXED			9040-9400 FIXED US340		Maritime (80) Private Land Mobile (90)
9400-9500 BROADCASTING 5.134 5.146			9400-9500 BROADCASTING 5.134 FIXED US340 US366		Radio Broadcast (HF) (73) Maritime (80)
9500-9900 BROADCASTING 5.147			9500-9900 BROADCASTING 5.147 US340 US367		Radio Broadcast (HF) (73)
9900-9995 FIXED			9900-9995 FIXED US340		Private Land Mobile (90)
9995-10003 STANDARD FREQUENCY AND TIME SIGNAL (10000 kHz) 5.111			9995-10003 STANDARD FREQUENCY AND TIME SIGNAL (10000 kHz) 5.111 US340		
10003-10005 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111			10003-10005 STANDARD FREQUENCY AND TIME SIGNAL 5.111 US340 G106	10003-10005 STANDARD FREQUENCY AND TIME SIGNAL 5.111 US340	
10005-10100 AERONAUTICAL MOBILE (R) 5.111			10005-10100 AERONAUTICAL MOBILE (R) 5.111 US283 US340		Aviation (87)
10100-10150 FIXED Amateur			10100-10150 US247 US340	10100-10150 AMATEUR US247 US340	Amateur (97)
10150-11175 FIXED Mobile except aeronautical mobile (R)			10150-11175 FIXED Mobile except aeronautical mobile (R) US340		Private Land Mobile (90)
11175-11275 AERONAUTICAL MOBILE (OR)			11175-11275 AERONAUTICAL MOBILE (OR) US340		

11275-11400 AERONAUTICAL MOBILE (R)	11275-11400 AERONAUTICAL MOBILE (R) US283 US340	Aviation (87)
11400-11600 FIXED	11400-11600 FIXED US340	Private Land Mobile (90)
11600-11650 BROADCASTING 5.134 5.146	11600-11650 BROADCASTING 5.134 FIXED US340 US366	Radio Broadcast (HF) (73)
11650-12050 BROADCASTING 5.147	11650-12050 BROADCASTING US340 US367	
12050-12100 BROADCASTING 5.134 5.146	12050-12100 BROADCASTING 5.134 FIXED US340 US366	
12100-12230 FIXED	12100-12230 FIXED US340	
12230-13200 MARITIME MOBILE 5.109 5.110 5.132 5.145	12230-13200 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 US296 US340	Maritime (80)
13200-13260 AERONAUTICAL MOBILE (OR)	13200-13260 AERONAUTICAL MOBILE (OR) US340	
13260-13360 AERONAUTICAL MOBILE (R)	13260-13360 AERONAUTICAL MOBILE (R) US283 US340	Aviation (87)
13360-13410 FIXED RADIO ASTRONOMY 5.149	13360-13410 RADIO ASTRONOMY US342 G115	13360-13410 RADIO ASTRONOMY US342

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
13410-13570 FIXED Mobile except aeronautical mobile (R)			13410-13570 FIXED Mobile except aeronautical mobile (R)	13410-13570 FIXED	ISM Equipment (18) Private Land Mobile (90)
5.150			5.150 US340	5.150 US340	
13570-13600 BROADCASTING 5.134			13570-13600 BROADCASTING 5.134 FIXED Mobile except aeronautical mobile (R)	13570-13600 BROADCASTING FIXED	Radio Broadcast (HF) (73)
5.151			US340 US366	US340 US366	
13600-13800 BROADCASTING			13600-13800 BROADCASTING US340		
13800-13870 BROADCASTING 5.134			13800-13870 BROADCASTING 5.134 FIXED Mobile except aeronautical mobile (R)	13800-13870 BROADCASTING FIXED	
5.151			US340 US366	US340 US366	Private Land Mobile (90)
13870-14000 FIXED Mobile except aeronautical mobile (R)			13870-14000 FIXED Mobile except aeronautical mobile (R) US340	13870-14000 FIXED US340	
14000-14250 AMATEUR AMATEUR-SATELLITE			14000-14350 US340	14000-14250 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
14250-14350 AMATEUR				14250-14350 AMATEUR	
5.152			US340	US340	Private Land Mobile (90)
14350-14990 FIXED Mobile except aeronautical mobile (R)			14350-14990 FIXED Mobile except aeronautical mobile (R) US340	14350-14990 FIXED US340	

14990-15005 STANDARD FREQUENCY AND TIME SIGNAL (15000 kHz) 5.111	14990-15005 STANDARD FREQUENCY AND TIME SIGNAL (15000 kHz) 5.111 US340	
15005-15010 STANDARD FREQUENCY AND TIME SIGNAL Space research	15005-15010 STANDARD FREQUENCY AND TIME SIGNAL US340 G106	15005-15010 STANDARD FREQUENCY AND TIME SIGNAL US340
15010-15100 AERONAUTICAL MOBILE (OR)	15010-15100 AERONAUTICAL MOBILE (OR) US340	
15100-15600 BROADCASTING	15100-15600 BROADCASTING US340	Radio Broadcast (HF) (73)
15600-15800 BROADCASTING 5.134 5.146	15600-15800 BROADCASTING 5.134 FIXED US340 US366	
15800-16360 FIXED 5.153	15800-16360 FIXED US340	Private Land Mobile (90)
16360-17410 MARITIME MOBILE 5.109 5.110 5.132 5.145	16360-17410 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82 US296 US340	
17410-17480 FIXED	17410-17480 FIXED US340	Private Land Mobile (90)
17480-17550 BROADCASTING 5.134 5.146	17480-17550 BROADCASTING 5.134 FIXED US340 US366	
17550-17900 BROADCASTING	17550-17900 BROADCASTING US340	Radio Broadcast (HF) (73)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
17900-17970 AERONAUTICAL MOBILE (R)			17900-17970 AERONAUTICAL MOBILE (R) US283 US340		Aviation (87)
17970-18030 AERONAUTICAL MOBILE (OR)			17970-18030 AERONAUTICAL MOBILE (OR) US340		
18030-18052 FIXED			18030-18068 FIXED		Maritime (80) Private Land Mobile (90)
18052-18068 FIXED Space research			US340		
18068-18168 AMATEUR AMATEUR-SATELLITE 5.154			18068-18168 US340	18068-18168 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
18168-18780 FIXED Mobile except aeronautical mobile			18168-18780 FIXED Mobile US340		Maritime (80) Private Land Mobile (90)
18780-18900 MARITIME MOBILE			18780-18900 MARITIME MOBILE US82 US296 US340		Maritime (80)
18900-19020 BROADCASTING 5.134 5.146			18900-19020 BROADCASTING 5.134 FIXED US340 US366		Radio Broadcast (HF) (73)
19020-19680 FIXED			19020-19680 FIXED US340		Private Land Mobile (90)
19680-19800 MARITIME MOBILE 5.132			19680-19800 MARITIME MOBILE 5.132 US340		Maritime (80)
19800-19990 FIXED			19800-19990 FIXED US340		Private Land Mobile (90)

19990-19995 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	19990-20010 STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz)	19990-20010 STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz)	
19995-20010 STANDARD FREQUENCY AND TIME SIGNAL (20000 kHz) 5.111			
20010-21000 FIXED Mobile	20010-21000 FIXED Mobile US340	20010-21000 FIXED US340	Private Land Mobile (90)
21000-21450 AMATEUR AMATEUR-SATELLITE	21000-21450 US340	21000-21450 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
21450-21850 BROADCASTING	21450-21850 BROADCASTING US340		Radio Broadcast (HF) (73)
21850-21870 FIXED 5.155A 5.155	21850-21924 FIXED US340		Aviation (87) Private Land Mobile (90)
21870-21924 FIXED 5.155B			
21924-22000 AERONAUTICAL MOBILE (R)	21924-22000 AERONAUTICAL MOBILE (R) US340		Aviation (87)
22000-22855 MARITIME MOBILE 5.132 5.156	22000-22855 MARITIME MOBILE 5.132 US82 US296 US340		Maritime (80)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
22855-23000 FIXED 5.156			22855-23000 FIXED US340		Private Land Mobile (90)
23000-23200 FIXED Mobile except aeronautical mobile (R) 5.156			23000-23200 FIXED Mobile except aeronautical mobile (R) US340	23000-23200 FIXED US340	
23200-23350 FIXED 5.156A AERONAUTICAL MOBILE (OR)			23200-23350 AERONAUTICAL MOBILE (OR) US340		
23350-24000 FIXED MOBILE except aeronautical mobile 5.157			23350-24890 FIXED MOBILE except aeronautical mobile US340	23350-24890 FIXED US340	Private Land Mobile (90)
24000-24890 FIXED LAND MOBILE					
24890-24990 AMATEUR AMATEUR-SATELLITE			24890-24990 US340	24890-24990 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
24990-25005 STANDARD FREQUENCY AND TIME SIGNAL (25000 kHz)			24990-25005 STANDARD FREQUENCY AND TIME SIGNAL (25000 kHz) US340		
25005-25010 STANDARD FREQUENCY AND TIME SIGNAL Space research			25005-25010 STANDARD FREQUENCY AND TIME SIGNAL US340 G106	25005-25010 STANDARD FREQUENCY AND TIME SIGNAL US340	
25010-25070 FIXED MOBILE except aeronautical mobile			25010-25070 US340	25010-25070 LAND MOBILE US340 NG112	Private Land Mobile (90)

5.175 5.179 5.184 5.187 87.5-100 BROADCASTING 5.190 100-108 BROADCASTING 5.192 5.194 108-117.975 AERONAUTICAL RADIONAVIGATION 5.197 5.197A 117.975-137 AERONAUTICAL MOBILE (R)	75.4-76 FIXED MOBILE	75.4-87 FIXED MOBILE	75.4-88	75.4-76 FIXED MOBILE NG3 NG49 NG56	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
	76-88 BROADCASTING Fixed Mobile	5.182 5.183 5.188 87-100 FIXED MOBILE BROADCASTING		76-88 BROADCASTING NG128 NG149	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
	5.185	88-100 BROADCASTING	88-108 BROADCASTING NG2	88-108 BROADCASTING NG2	Broadcast Radio (FM) (73) Auxiliary Broadcasting (74)
	88-100 BROADCASTING				
5.111 5.198 5.199 5.200 5.201 5.202 5.203 5.203A 5.203B			US93	US93 NG128	Aviation (87)
			108-117.975 AERONAUTICAL RADIONAVIGATION		
			US93 US343		
			117.975-121.9375 AERONAUTICAL MOBILE (R)		
			5.111 5.198 5.199 5.200 US26 US28		
			121.9375-123.0875	121.9375-123.0875 AERONAUTICAL MOBILE	
		5.198 US30 US31 US33 US80 US102 US213	5.198 US30 US31 US33 US80 US102 US213		
		123.0875-123.5875 AERONAUTICAL MOBILE			
		5.198 5.200 US32 US33 US112			
		See next page for 123.5875-137 MHz		See next page for 123.5875-137 MHz	

223-230 BROADCASTING Fixed Mobile	225-235 FIXED MOBILE	223-230 FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION Radiolocation	225-235 FIXED MOBILE	225-235	
5.243 5.246 5.247		5.250			
230-235 FIXED MOBILE		230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION			
5.247 5.251 5.252		5.250	G27		
235-267 FIXED MOBILE			235-267 FIXED MOBILE	235-267	
5.111 5.199 5.252 5.254 5.256 5.256A			5.111 5.199 5.256 G27 G100	5.111 5.199 5.256	
267-272 FIXED MOBILE Space operation (space-to-Earth)			267-322 FIXED MOBILE	267-322	
5.254 5.257					
272-273 SPACE OPERATION (space-to-Earth) FIXED MOBILE					
5.254					
273-312 FIXED MOBILE					
5.254					
312-315 FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255					
315-322 FIXED MOBILE			G27 G100		
5.254					

322-410 MHz (UHF)					Page 33
International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
322-328.6 FIXED MOBILE RADIO ASTRONOMY			322-328.6 FIXED MOBILE	322-328.6	
5.149			US342 G27	US342	
328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258			328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258		
5.259					
335.4-387 FIXED MOBILE			335.4-399.9 FIXED MOBILE	335.4-399.9	
5.254					
387-390 FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.254 5.255					
390-399.9 FIXED MOBILE					
5.254			G27 G100		
399.9-400.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.222 5.224B 5.260			399.9-400.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE 5.260		Satellite Communications (25)
5.220					
400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz)			400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL- SATELLITE (400.1 MHz)		
5.261 5.262			5.261		
400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth)			400.15-401 METEOROLOGICAL AIDS (radiosonde) US70 METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 US324	400.15-401 METEOROLOGICAL AIDS (radiosonde) US70 MOBILE-SATELLITE (space-to-Earth) US319 US320 US324 SPACE RESEARCH (space-to-Earth) 5.263	Satellite Communications (25)

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5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E			454-456	454-455 FIXED LAND MOBILE NG12 NG112 NG148	Public Mobile (22) Maritime (80)	
455-456 FIXED MOBILE	455-456 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C	455-456 FIXED MOBILE		455-456 LAND MOBILE	Auxiliary Broadcasting (74)	
5.209 5.271 5.286A 5.286B 5.286C 5.286E	5.209	5.209 5.271 5.286A 5.286B 5.286C 5.286E				
456-459 FIXED MOBILE 5.271 5.287 5.288			456-460	456-460 FIXED LAND MOBILE	Public Mobile (22) Maritime (80) Private Land Mobile (90)	
459-460 FIXED MOBILE	459-460 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C	459-460 FIXED MOBILE				
5.209 5.271 5.286A 5.286B 5.286C 5.286E	5.209	5.209 5.271 5.286A 5.286B 5.286C 5.286E	5.287 5.288	5.287 5.288 NG112 NG124 NG148		
460-470 FIXED MOBILE Meteorological-satellite (space-to-Earth)			460-470 Meteorological-satellite (space-to-Earth)	460-462.5375 FIXED LAND MOBILE	Private Land Mobile (90)	
				5.289 US201 US209 NG124		
				462.5375-462.7375 LAND MOBILE		Personal Radio (95)
				5.289 US201		
				462.7375-467.5375 FIXED LAND MOBILE		Private Land Mobile (90)
				5.287 5.289 U S201 US209 US216 NG124		
5.287 5.288 5.289 5.290			5.287 5.288 5.289 US201 US209 US216	467.5375-467.7375 LAND MOBILE	Personal Radio (95)	
				5.287 5.289 US201		
				467.7375-470 FIXED LAND MOBILE		Private Land Mobile (90)
				5.288 5.289 US201 US216 NG124		

5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311 5.312				776-794 FIXED MOBILE BROADCASTING NG115 NG128 NG159	Wireless Communications (27) Broadcast Radio (TV) (73) Auxiliary Broadcast. (74) Private Land Mobile (90)
790-862 FIXED BROADCASTING	5.293 5.309 5.311			794-806 FIXED MOBILE NG115 NG128 NG158 NG159	Auxiliary Broadcasting (74) Private Land Mobile (90)
	806-890 FIXED MOBILE BROADCASTING			806-821 FIXED LAND MOBILE NG31	Public Mobile (22) Private Land Mobile (90)
5.312 5.314 5.315 5.316 5.319 5.321				821-824 LAND MOBILE	Private Land Mobile (90)
				824-849 FIXED LAND MOBILE	Public Mobile (22)
See next page for 862-890 MHz	5.317 5.318	5.149 5.305 5.306 5.307 5.311 5.320		See next page for 849-894 MHz	See next page for 866-896 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous pages for 470-862 MHz	See previous pages for 614-890 MHz	See previous pages for 585-890 MHz	See previous pages for 614-890 MHz	See previous pages for 614-849 MHz	See previous pages for 614-849 MHz
				849-851 AERONAUTICAL MOBILE	Public Mobile (22)
				851-866 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
862-890 FIXED MOBILE except aeronautical mobile BROADCASTING 5.322				NG31	
				866-869 LAND MOBILE	Private Land Mobile (90)
5.319 5.323				869-894 FIXED LAND MOBILE	Public Mobile (22)
890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation	890-902 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation	890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation	890-902	US116 US268	
				894-896 AERONAUTICAL MOBILE	
				US116 US268	
				896-901 FIXED LAND MOBILE	Private Land Mobile (90)
				US116 US268	
				901-902 FIXED MOBILE	Personal Communications (24)
	5.318 5.325		US116 US268 G2	US116 US268	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 890-942 MHz	See previous page for 928-942 MHz	See previous page for 890-942 MHz	941-944 FIXED	941-944 FIXED	Public Mobile (22) Fixed Microwave (101)
942-960 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322	942-960 FIXED MOBILE 5.317A	942-960 FIXED MOBILE 5.317A BROADCASTING	US268 US301 US302 G2	US268 US301 US302 NG120	
5.323		5.320	944-960	944-960 FIXED NG120	Public Mobile (22) Auxiliary Broadcast. (74) Fixed Microwave (101)
960-1164 AERONAUTICAL RADIONAVIGATION 5.328			960-1164 AERONAUTICAL RADIONAVIGATION 5.328 US224		Aviation (87)
1164-1215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A			1164-1215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328A US224		
1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332			1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) Gxxx SPACE RESEARCH (active) 5.332	1215-1240 Earth exploration-satellite (active) Space research (active)	
1240-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A			1240-1300 AERONAUTICAL RADIONAVIGATION EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 SPACE RESEARCH (active) 5.332 5.335	1240-1300 AERONAUTICAL RADIONAVIGATION Amateur Earth exploration-satellite (active) Space research (active) 5.282	Amateur (97)

1300-1350 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION RADIONAVIGATION-SATELLITE (Earth-to-space)		1300-1350 AERONAUTICAL RADIO- NAVIGATION 5.337 Radiolocation G2	1300-1350 AERONAUTICAL RADIO- NAVIGATION 5.337	Aviation (87)
5.149 5.337A		US342	US342	
1350-1400 FIXED MOBILE RADIOLOCATION	1350-1400 RADIOLOCATION	1350-1390 FIXED MOBILE RADIOLOCATION G2	1350-1390	
		5.334 5.339 US311 US342 G27 G114	5.334 5.339 US311 US342	
		1390-1395	1390-1392 FIXED MOBILE except aeronautical mobile Fixed-satellite (Earth-to-space) US368	Wireless Communications (27)
			5.339 US311 US342 US351	
	1392-1395 FIXED MOBILE except aeronautical mobile			
5.339 US311 US342 US351	5.339 US311 US342 US351			
5.149 5.338 5.339 5.339A	5.149 5.334 5.339 5.339A	1395-1400 LAND MOBILE US350		Personal (95)
		5.339 US311 US342 US351		
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
5.340 5.341		5.341 US246		
1427-1429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile	5.341	1427-1429.5 LAND MOBILE US350	1427-1429.5 LAND MOBILE Fixed (telemetry)	Private Land Mobile (90) Personal (95)
		5.341 US352	5.341 US350 US352	
See next page for 1429-11452 MHz				

1429.5-1610 MHz (UHF)					Page 43
International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1429-1452 FIXED MOBILE except aeronautical mobile	1429-1452 FIXED MOBILE 5.343		1429.5-1432	1429.5-1430 FIXED (telemetry) LAND MOBILE (telemetry)	Private Land Mobile (90) Personal (95)
				5.341 US350 US352	
				1430-1432 FIXED (telemetry) LAND MOBILE (telemetry) Fixed-satellite (space-to-Earth) US368	
			5.341 US350 US352	5.341 US350 US352	
			1432-1435	1432-1435 FIXED MOBILE except aeronautical mobile	Wireless Communications (27)
			5.341 US361	5.341 US361	
5.339A 5.341 5.342	5.339A 5.341		1435-1525 MOBILE (aeronautical telemetry)		Aviation (87)
1452-1492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 5.347 BROADCASTING-SATEL- LITE 5.345 5.347 5.347A	1452-1492 FIXED MOBILE 5.343 BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.347A				
5.341 5.342	5.341 5.344				
1492-1518 FIXED MOBILE except aeronautical mobile	1492-1518 FIXED MOBILE 5.343	1492-1518 FIXED MOBILE			
5.341 5.342	5.341 5.344	5.341			
1518-1525 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.348C	1518-1525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.348C	1518-1525 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.348C			
5.341 5.342	5.341 5.344	5.341	5.341 US78		

1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.347A 5.350 5.351 5.352A 5.354	1525-1530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.347A 5.351 5.354	1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Mobile 5.349 5.341 5.347A 5.351 5.352A 5.354	1525-1535 MOBILE-SATELLITE (space-to-Earth) US315 US380	Satellite Communications (25) Maritime (80)
1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space- to-Earth) 5.351A 5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile 5.341 5.342 5.347A 5.351 5.354	1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.347A 5.351 5.354		5.341 5.351	
1535-1559 MOBILE-SATELLITE (space-to-Earth) 5.351A 5.341 5.347A 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A			1535-1559 MOBILE-SATELLITE (space-to-Earth) US308 US309 US315 US380 5.341 5.351 5.356	Satellite Communications (25) Maritime (80) Aviation (87)
1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329A 5.341 5.362B 5.362C 5.363			1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.341 US208 US260	Aviation (87)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.363 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE(Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208		Satellite Communications (25) Aviation (87)
1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.355 5.359 5.363 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) US319 US380 RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208 US342		
1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.347A 5.341 5.355 5.359 5.363 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) Mobile-satellite (space-to- Earth) 5.347A 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to- Earth) 5.347A Radiodetermination- satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.341 5.364 5.365 5.366 5.367 5.368 5.372 US208		

1626.5-1660 MOBILE-SATELLITE (Earth-to-space) 5.351A	1626.5-1660 MOBILE-SATELLITE (Earth-to-space) US308 US309 US315 US380	Satellite Communications (25) Maritime (80) Aviation (87)
5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376	5.341 5.351 5.375	
1660-1660.5 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY	1660-1660.5 MOBILE-SATELLITE (Earth-to-space) US308 US309 US380 RADIO ASTRONOMY	Satellite Communications (25) Aviation (87)
5.149 5.341 5.351 5.354 5.362A 5.376A	5.341 5.351 US342	
1660.5-1668 RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile	1660.5-1668.4 RADIO ASTRONOMY US74 SPACE RESEARCH (passive)	
5.149 5.341 5.379 5.379A		
1668-1668.4 MOBILE-SATELLITE (Earth-to-space) 5.348C 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile		
5.149 5.341 5.379 5.379A 5.379D	5.341 US246	
1668.4-1670 METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.348C 5.379B 5.379C RADIO ASTRONOMY	1668.4-1670 METEOROLOGICAL AIDS (radiosonde) RADIO ASTRONOMY US74	
5.149 5.341 5.379D 5.379E	5.341 US99 US342	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1670-1675 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE 5.380 MOBILE-SATELLITE (Earth-to-space) 5.348C 5.379B 5.341 5.379D 5.379E 5.380A			1670-1675 5.341 US211 US362	1670-1675 FIXED MOBILE except aeronautical mobile 5.341 US211 US362	Wireless Communications (27)
1675-1690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341			1675-1700 METEOROLOGICAL AIDS (radiosonde) METEOROLOGICAL-SATELLITE (space-to-Earth)		
1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 5.382	1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341 5.381		5.289 5.341 US211		
1700-1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341		1700-1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341 5.384	1700-1710 FIXED G118 METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341	1700-1710 METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed 5.289 5.341	
1710-1930 FIXED MOBILE 5.380 5.384A 5.388A			1710-1755 5.341 US311 US378	1710-1755 FIXED MOBILE 5.341 US311 US378	Wireless Communications (27)

			1755-1850 FIXED MOBILE G42	1755-1850	
5.149 5.341 5.385 5.386 5.387 5.388			1850-2025	1850-2000 FIXED MOBILE	RF Devices (15) Personal Communications (24) Fixed Microwave (101)
1930-1970 FIXED MOBILE 5.388A	1930-1970 FIXED MOBILE 5.388A Mobile-satellite (Earth-to-space)	1930-1970 FIXED MOBILE 5.388A			
5.388	5.388	5.388			
1970-1980 FIXED MOBILE 5.388A 5.388					
1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F					
2010-2025 FIXED MOBILE 5.388A	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)	2010-2025 FIXED MOBILE 5.388A			
5.388	5.388 5.389C 5.389E 5.390	5.388		2000-2020 MOBILE-SATELLITE (Earth-to-space) US380	Satellite Communications (25)
				NG156	
				2020-2025 FIXED MOBILE	
				NG177	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space)			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION- SATELLITE (Earth-to- space) (space-to-space) SPACE RESEARCH (Earth- to-space) (space-to-space) 5.391 5.392 US90 US222 US346 US347	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US222 US346 US347	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)
5.392					

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2110-2120 FIXED MOBILE 5.388A SPACE RESEARCH (deep space) (Earth-to-space)			2110-2120	2110-2155 FIXED MOBILE	Domestic Public Fixed (21) Public Mobile (22) Wireless Communications (27) Fixed Microwave (101)
5.388			US252		
2120-2160 FIXED MOBILE 5.388A	2120-2160 FIXED MOBILE 5.388A Mobile-satellite (space-to-Earth)	2120-2170 FIXED MOBILE 5.388A	2120-2200	US252	
5.388	5.388			2155-2160 FIXED	Domestic Public Fixed (21) Fixed Microwave (101)
2160-2170 FIXED MOBILE 5.388A	2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)			2160-2180 FIXED NG153 MOBILE	Domestic Public Fixed (21) Public Mobile (22) Fixed Microwave (101)
5.388 5.392A	5.388 5.389C 5.389E 5.390	5.388		NG178	
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A				2180-2200 MOBILE-SATELLITE (space-to-Earth) US380	Satellite Communications (25)
5.388 5.389A 5.389F 5.392A				NG168	
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space)			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only)	2200-2290	

2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A Radiolocation 5.150 5.371 5.397 5.398 5.399 5.400 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION- SATELLITE (space-to- Earth) 5.398 5.150 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 5.398 5.150 5.400 5.402	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION- SATELLITE (space-to- Earth) 5.398 5.150 5.402 US41	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION- SATELLITE (space-to- Earth) 5.398 5.150 5.402 US41 NG147	ISM Equipment (18) Satellite Communications (25) Private Land Mobile (90) Fixed Microwave (101)
2500-2520 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space- to-Earth) 5.403 5.351A 5.405 5.407 5.412 5.414	2500-2520 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.403 5.351A 5.404 5.407 5.414 5.415A		2500-2655	2500-2655 FIXED US205 MOBILE except aeronautical mobile	Domestic Public Fixed (21) Instructional TV Fixed (74)
2520-2655 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416 5.339 5.403 5.405 5.412 5.418AC 5.418AD 5.418B 5.418C	2520-2655 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416 5.339 5.403 5.418AC 5.418AD 5.418B 5.418C	2520-2535 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416 5.339 5.418 5.418AA 5.418AB 5.418AC 5.418AD 5.418A 5.418B 5.418C			
		5.403 5.415A 2535-2655 FIXED 5.409 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416			

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2655-2670 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.347A 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2670 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2670 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.347A 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2690 Earth exploration-satellite (passive) Radio astronomy US269 Space research (passive)	2655-2690 FIXED US205 MOBILE except aeronautical mobile Earth exploration-satellite (passive) Radio astronomy Space research (passive)	Domestic Public Fixed (21) Instructional TV Fixed (74)
5.149 5.412 5.420	5.149 5.347A 5.420	5.149 5.420			
2670-2690 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2670-2690 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.347A 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2670-2690 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive)			
5.149 5.412 5.419 5.420	5.149 5.419 5.420	5.149 5.419 5.420 5.420A	US205	US269	
2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
5.340 5.422			US246		
2700-2900 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation			2700-2900 AERONAUTICAL RADIO-NAVIGATION 5.337 METEOROLOGICAL AIDS Radiolocation G2	2700-2900	
5.423 5.424			5.423 US18 G15	5.423 US18	

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4200-4400 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION 5.440 US261		Aviation (87)
4400-4500 FIXED MOBILE			4400-4500 FIXED MOBILE	4400-4500	
4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE			4500-4800 FIXED MOBILE US245	4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.442 Radio astronomy			4800-4940 FIXED MOBILE US203 US342	4800-4940 US203 US342	
			4940-4990	4940-4990 FIXED MOBILE except aeronautical mobile	Private Land Mobile (90) Fixed Microwave (101)
5.149 5.339 5.443			5.339 US311 US342 G122	5.339 US311 US342	
4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149			4990-5000 RADIO ASTRONOMY US74 Space research (passive) US246		
5000-5010 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367			5000-5010 AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.367 US211 US344		Satellite Communications (25) Aviation (87)
5010-5030 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B 5.367			5010-5030 AERONAUTICAL RADIONAVIGATION US260 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.443B 5.367 US211 US344		
5030-5150 AERONAUTICAL RADIONAVIGATION 5.367 5.444 5.444A			5030-5250 AERONAUTICAL RADIO- NAVIGATION US260	5030-5150 AERONAUTICAL RADIO- NAVIGATION US260 5.367 5.444 5.444A US211 US344	

5150-5250 AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B	5.367 5.444 US211 US307 US344	5150-5250 AERONAUTICAL RADIO- NAVIGATION US260 FIXED-SATELLITE (Earth- to-space) 5.447A US344 5.447C US211 US307	RF Devices (15) Satellite Communications (25) Aviation (87)
5.446 5.447 5.447B 5.447C			
5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D MOBILE except aeronautical mobile 5.446A 5.447F	5250-5255 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.447D 5.448A	5250-5255 Earth exploration-satellite (active) Radiolocation Space research 5.558A	RF Devices (15) Private Land Mobile (90)
5.447E 5.448 5.448A			
5255-5350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mobile 5.446A 5.447F	5255-5350 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.448A	5255-5350 Earth exploration-satellite (active) Radiolocation Space research (active) 5.448A	
5.447E 5.448 5.448A			
5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D	5350-5460 EARTH EXPLORATION- SATELLITE (active) 5.448B SPACE RESEARCH (active) AERONAUTICAL RADIO- NAVIGATION 5.449 RADIOLOCATION G56 US390 G130	5350-5460 AERONAUTICAL RADIO- NAVIGATION 5.449 Earth exploration-satellite (active) 5.448B Space research (active) Radiolocation US390	Aviation (87) Private Land Mobile (90)
5460-5470 RADIONAVIGATION 5.449 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.448D	5460-5470 RADIONAVIGATION 5.449 US65 EARTH EXPLORATION- SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION G56 5.448B US49 G130	5460-5470 RADIONAVIGATION 5.449 US65 Earth exploration-satellite (active) Space research (active) Radiolocation 5.448B US49	Private Land Mobile (90)
5.448B			
5470-5570 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.450B	5470-5570 MARITIME RADIONAVIGATION US65 EARTH EXPLORATION- SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION G56 5.448B US50 G131	5470-5570 MARITIME RADIONAVIGATION US65 RADIOLOCATION Earth exploration-satellite (active) Space research (active) US50	RF Devices (15) Maritime (80) Private Land Mobile (90)
5.448B 5.450 5.451 5.452			

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5570-5650 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B			5570-5600 MARITIME RADIONAVIGATION US65 RADIOLOCATION G56 US50 G131	5570-5600 MARITIME RADIONAVIGATION US65 RADIOLOCATION US50	RF Devices (15) Maritime (80) Private Land Mobile (90)
5.450 5.451 5.452			5600-5650 MARITIME RADIONAVIGATION US65 METEOROLOGICAL AIDS RADIOLOCATION G56 5.452 US50 G131	5600-5650 MARITIME RADIONAVIGATION US65 METEOROLOGICAL AIDS RADIOLOCATION 5.452 US50	
5650-5725 RADIOLOCATION MOBILE except aeronautical mobile 5.446A 5.450A Amateur Space research (deep space) 5.282 5.451 5.453 5.454 5.455			5650-5925 RADIOLOCATION G2	5650-5830 Amateur	RF Devices (15) ISM Equipment (18) Amateur (97)
5725-5830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455 5.456	5725-5830 RADIOLOCATION Amateur			5.150 5.282	
5830-5850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.451 5.453 5.455 5.456	5830-5850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth)			5830-5850 Amateur Amateur-satellite (space-to-Earth)	ISM Equipment (18) Amateur (97)
5.150 5.453 5.455				5.150	
5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150		5850-5925 FIXED-SATELLITE (Earth-to-space) US245 MOBILE NG160 Amateur	ISM Equipment (18) Private Land Mobile (90) Personal Radio (95) Amateur (97)
5.150 US245				5.150	
5925-6700 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE			5925-6425	5925-6425 FIXED NG41 FIXED-SATELLITE (Earth-to-space)	International Fixed (23) Satellite Commun. (25) Fixed Microwave (101)

	6425-6525	6425-6525 FIXED-SATELLITE (Earth-to-space) MOBILE	Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
	5.440 5.458	5.440 5.458	
5.149 5.440 5.458	6525-6700	6525-6700 FIXED FIXED-SATELLITE (Earth-to-space)	Satellite Communications (25) Fixed Microwave (101)
	5.458 US342	5.458 US342	
6700-7075 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE	6700-7125	6700-6875 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 5.458 5.458A 5.458B	
		6875-7025 FIXED NG118 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE NG171 5.458 5.458A 5.458B	Satellite Communications (25) Auxiliary Broadcasting (74) Cable TV Relay (78)
		7025-7075 FIXED NG118 FIXED-SATELLITE (Earth-to-space) NG172 MOBILE NG171 5.458 5.458A 5.458B	
5.458 5.458A 5.458B 5.458C			
7075-7145 FIXED MOBILE		7075-7125 FIXED NG118 MOBILE NG171	Auxiliary Broadcasting (74) Cable TV Relay (78)
	5.458	5.458	
5.458 5.459	7125-7145 FIXED	7125-7190	
	5.458 G116		
7145-7235 FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460	7145-7190 FIXED SPACE RESEARCH (deep space) (Earth-to- space) US262		
	5.458 G116	5.458 US262	
5.458 5.459	See next page for 7190-7235 MHz	See next page for 7190-7250	

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7235-7250 FIXED MOBILE 5.458			7235-7250 FIXED 5.458	5.458	
7250-7300 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461			7250-7300 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Fixed G117	7250-8025	
7300-7450 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461			7300-7450 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G117		
7450-7550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461A			7450-7550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SAT- ELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G104 G117		
7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile			7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G117		

7750-7850 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	7750-7850 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B		
7850-7900 FIXED MOBILE except aeronautical mobile	7850-7900 FIXED		
7900-8025 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	7900-8025 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Fixed		
5.461	G117		
8025-8175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463	8025-8175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) (no airborne transmissions)	8025-8215	
5.462A	US258 G117		
8175-8215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463	8175-8215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) (no airborne transmissions)		
5.462A	US258 G104 G117	US258	

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8215-8400 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463			8215-8400 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) (no airborne transmissions)	8215-8400	
5.462A			US258 G117	US258	
8400-8500 FIXED 5.486 MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465 5.466			8400-8450 FIXED SPACE RESEARCH (space-to-Earth) (deep space only)	8400-8450 Space research (space-to-Earth) (deep space only)	
			8450-8500 FIXED SPACE RESEARCH (space-to-Earth)	8450-8500 SPACE RESEARCH (space-to-Earth)	
8500-8550 RADIOLOCATION			8500-8550 RADIOLOCATION G59	8500-8550 Radiolocation	
5.468 5.469					
8550-8650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)			8550-8650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active)	8550-8650 Earth exploration-satellite (active) Radiolocation Space research (active)	
5.468 5.469 5.469A					
8650-8750 RADIOLOCATION			8650-9000 RADIOLOCATION G59	8650-9000 Radiolocation	
5.468 5.469					
8750-8850 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470					
5.471					

10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile		10.7-11.7 US211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US211 NG104 US355	Satellite Communications (25) Fixed Microwave (101)
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A Mobile except aeronautical mobile 5.485 5.488	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.487 5.487A 5.492	11.7-12.1 5.486	11.7-12.2 FIXED-SATELLITE (space-to-Earth) NG143 NG145 Mobile except aeronautical mobile 5.486 5.488	
	12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.485 5.488 5.489		12.1-12.2		
	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.487 5.487A 5.492	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487	12.2-12.7	12.2-12.7 FIXED BROADCASTING-SATELLITE	
12.5-12.75 FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space)	5.487A 5.488 5.490 5.492	12.5-12.75 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A	5.490	5.487A 5.488 5.490	See next page for 12.7-12.75 GHz
See next page for 12.7-12.75 GHz	MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493	See next page for 12.7-12.75 GHz			
5.494 5.495 5.496					

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Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 12.5-12.75 GHz	12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	See previous page for 12.5-12.75 GHz	12.7-12.75	12.7-12.75 FIXED NG118 FIXED-SATELLITE (Earth-to-space) MOBILE NG53	Satellite Communications (25) Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
12.75-13.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)			12.75-13.25 US251	12.75-13.25 FIXED NG118 FIXED-SATELLITE (Earth- to-space) 5.441 NG104 MOBILE US251 NG53	
13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active)			13.25-13.4 EARTH EXPLORATION- SATELLITE (active) AERONAUTICAL RADIO- NAVIGATION 5.497 SPACE RESEARCH (active)	13.25-13.4 AERONAUTICAL RADIO- NAVIGATION 5.497 Earth exploration-satellite (active) Space research (active)	Aviation (87)
5.498A 5.499			5.498A		
13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space)			13.4-13.75 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active) 5.501A Standard frequency and time signal-satellite (Earth-to-space)	13.4-13.75 Earth exploration-satellite (active) Radiolocation Space research Standard frequency and time signal-satellite (Earth-to-space)	Private Land Mobile (90)
5.499 5.500 5.501 5.501B			5.501B		
13.75-14 FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research			13.75-14 RADIOLOCATION G59 Standard frequency and time signal-satellite (Earth-to-space) Space research US337	13.75-14 FIXED-SATELLITE (Earth-to-space) US337 Radiolocation Standard frequency and time signal-satellite (Earth-to-space) Space research	Satellite Communications (25) Private Land Mobile (90)
5.499 5.500 5.501 5.502 5.503			US356 US357	US356 US357	

14-14.25 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504C 5.506A Space research			14-14.2 RADIONAVIGATION US292 Space research	14-14.2 FIXED-SATELLITE (Earth-to-space) RADIONAVIGATION US292 Mobile-satellite (Earth-to-space) Space research	Satellite Communications (25) Maritime (80) Aviation (87)
5.504A 5.505			14.2-14.4	14.2-14.4 FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) Mobile except aeronautical mobile	Satellite Communications (25) Fixed Microwave (101)
14.25-14.3 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.506A 5.508A Space research					
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A 5.509A Radionavigation-satellite	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A 5.509A Radionavigation-satellite			
5.504A	5.504A	5.504A			
14.4-14.47 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A 5.509A Space research (space-to-Earth)			14.4-14.47 Fixed Mobile	14.4-14.47 FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space)	Satellite Communications (25)
5.504A					
14.47-14.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy			14.47-14.5 Fixed Mobile	14.47-14.5 FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space)	
5.149 5.504A			US203 US342	US203 US342	

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14.5-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research			14.5-14.7145 FIXED Mobile Space research	14.5-14.8	
			14.7145-14.8 MOBILE Fixed Space research		
14.8-15.35 FIXED MOBILE Space research			14.8-15.1365 MOBILE SPACE RESEARCH Fixed	14.8-15.1365	
			US310	US310	
			15.1365-15.35 FIXED SPACE RESEARCH Mobile	15.1365-15.35	
5.339			5.339 US211	5.339 US211	
15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
5.340 5.511			US246		
15.4-15.43 AERONAUTICAL RADIONAVIGATION			15.4-15.43 AERONAUTICAL RADIONAVIGATION US260		Aviation (87)
5.511D			US211		
15.43-15.63 FIXED SATELLITE (Earth-to-space) 5.511A AERONAUTICAL RADIONAVIGATION			15.43-15.63 AERONAUTICAL RADIO- NAVIGATION US260	15.43-15.63 FIXED SATELLITE (Earth-to-space) AERONAUTICAL RADIO- NAVIGATION US260	Satellite Communications (25) Aviation (87)
5.511C			5.511C US211 US359	5.511C US211 US359	
15.63-15.7 AERONAUTICAL RADIONAVIGATION			15.63-15.7 AERONAUTICAL RADIONAVIGATION US260		Aviation (87)
5.511D			US211		
15.7-16.6 RADIOLOCATION			15.7-16.6 RADIOLOCATION G59	15.7-17.2 Radiolocation	Private Land Mobile (90)
5.512 5.513					

16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space)			16.6-17.1 RADIOLOCATION G59 Space research (deep Space) (Earth-to-space)		
5.512 5.513					
17.1-17.2 RADIOLOCATION			17.1-17.2 RADIOLOCATION G59		
5.512 5.513					
17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)			17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH (active)	17.2-17.3 Radiolocation Earth exploration-satellite (active) Space research (active)	
5.512 5.513 5.513A					
17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation	17.3-17.7 Radiolocation US259 G59	17.3-17.7 FIXED-SATELLITE (Earth-to-space) US271 BROADCASTING-SATELLITE NG163 NG167	Satellite Communications (25)
5.514	5.514 5.515 5.517	5.514		US259	
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.518 5.515 5.517	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE	17.7-17.8	17.7-17.8 FIXED FIXED-SATELLITE (Earth-to-space) US271	Satellite Communications (25) Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516 MOBILE		17.8-18.3 FIXED-SATELLITE (space-to-Earth) US334 G117	17.8-18.3 FIXED	Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B (Earth-to-space) 5.520 MOBILE			5.519	5.519 US334 NG144	
5.519 5.521			See next page for 18.3-18.6 GHz	See next page for 18.3-18.58 GHz	See next page for 18.3-18.58 GHz

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See previous page for 18.1-18.4 GHz			18.3-18.6 FIXED-SATELLITE (space-to-Earth) US334 G117	18.3-18.6 FIXED-SATELLITE (space-to-Earth) NG164 US334 NG144	Satellite Communications (25)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE					
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive)	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive)	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive)	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 US334 G117 SPACE RESEARCH (passive)	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 SPACE RESEARCH (passive)	
5.522A 5.522C	5.522A	5.522A	US254	US254 US334 NG144	
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) US334 G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 US334 NG144	
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-space) 5.523B 5.523C 5.523D 5.523E MOBILE				19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) NG166 US334 NG144	Satellite Communications (25) Auxiliary Broadcast. (74) Cable TV Relay (78) Fixed Microwave (101)
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth)	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth)	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B Mobile-satellite (space-to-Earth)		19.7-20.1 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
5.524	5.524 5.525 5.526 5.527 5.528 5.529	5.524		5.525 5.526 5.527 5.528 5.529 US334	

20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE-SATELLITE (space-to-Earth)				20.1-20.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528 US334	
5.524 5.525 5.526 5.527 5.528					
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth)			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) G117	20.2-21.2 Standard frequency and time signal-satellite (space-to-Earth)	
5.524					
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING- SATELLITE 5.347A 5.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING- SATELLITE 5.347A 5.530 5.531	21.4-22 FIXED MOBILE		
22-22.21 FIXED MOBILE except aeronautical mobile			22-22.21 FIXED MOBILE except aeronautical mobile US342		
5.149					
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive)			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive)		
5.149 5.532			US342 US263		

24.45-24.75 FIXED INTER-SATELLITE	24.45-24.65 INTER-SATELLITE RADIONAVIGATION	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION	24.45-24.65 INTER-SATELLITE RADIONAVIGATION		Satellite Communications (25)
	5.533	5.533	5.533		
	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATEL- LITE (Earth-to-space)	24.65-24.75 FIXED INTER-SATELLITE MOBILE 5.533	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		
24.75-25.25 FIXED	24.75-25.25 FIXED-SATELLITE (Earth-to-space) 5.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE	24.75-25.05 RADIONAVIGATION	24.75-25.05 FIXED-SATELLITE (Earth-to-space) NG167 RADIONAVIGATION	Satellite Communications (25) Aviation (87)
			25.05-25.25	25.05-25.25 FIXED-SATELLITE (Earth-to-space) NG167 FIXED	Satellite Communications (25) Fixed Microwave (101)
25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)			25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)	25.25-25.5 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space)	
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space)			25.5-27 EARTH EXPLORATION- SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space)	25.5-27 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space)	
5.536A			5.536A US258	5.536A US258	
27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE		27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 Inter-satellite 5.536	

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27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540			27.5-30	27.5-29.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	Satellite Communications (25) Fixed Microwave (101)
28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540					
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540					
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)		29.5-29.9 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) 5.525 5.526 5.527 5.529	Satellite Communications (25)
5.540 5.542 29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542		5.540 5.542		29.9-30 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) 5.525 5.526 5.527 5.543	

International Table			United States Table		FCC Rule Part(s)
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32-32.3 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548			32-32.3 RADIONAVIGATION US69 SPACE RESEARCH (deep space) (space-to-Earth) US262 US386	32-32.3 SPACE RESEARCH (deep space) (space-to-Earth) US262 US386	
32.3-33 FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547D 5.548			32.3-33 INTER-SATELLITE US278 RADIONAVIGATION US69 US386		Aviation (87)
33-33.4 FIXED 5.547A RADIONAVIGATION 5.547 5.547E			33-33.4 RADIONAVIGATION US69 US360 G117		
33.4-34.2 RADIOLOCATION 5.549			33.4-34.2 RADIOLOCATION US360 G117	33.4-34.2 Radiolocation US360	Private Land Mobile (90)
34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549			34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) US262 US360 G34 G117	34.2-34.7 Radiolocation Space research (deep space) (Earth-to-space) US262 US360	
34.7-35.2 RADIOLOCATION Space research 5.550 5.549			34.7-35.5 RADIOLOCATION	34.7-35.5 Radiolocation	
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION 5.549			US360 G117	US360	
35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.549A			35.5-36 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) US360 G117	35.5-36 Earth exploration-satellite (active) Radiolocation Space research (active) US360	

		45.5-46.9 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554	RF Devices (15)
5.554		46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION- SATELLITE 5.554	
47-47.2 AMATEUR AMATEUR-SATELLITE		46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION- SATELLITE 5.554	
47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A		47-47.2 AMATEUR AMATEUR-SATELLITE	Amateur (97)
47.5-47.9 FIXED FIXED-SATELLITE (Earth-to- space) 5.552 (space-to- Earth) 5.516B 5.554A MOBILE	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE	47.2-48.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE	Satellite Communications (25)
47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A			
48.2-48.54 FIXED FIXED-SATELLITE (Earth-to- space) 5.552 (space-to- Earth) 5.516B 5.554A MOBILE 5.555B	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.552 MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE US264	
48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.149 5.340 5.555 5.555B			
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International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
49.44-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A MOBILE 5.555B	See previous page for 48.2-50.2 GHz		See previous page for 48.2-50.2 GHz		See previous page for 47.2-50.2 GHz
50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340			50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Mobile-satellite (Earth-to-space)			50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) G117	50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space)	
51.4-52.6 FIXED MOBILE 5.547 5.556			51.4-52.6 FIXED MOBILE		
52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556			52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive) 5.556B			54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)		
55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US263 US353		
56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive)			56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE G128 MOBILE 5.558	56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 SPACE RESEARCH	

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INTERNATIONAL FOOTNOTES

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5.56 The stations of services to which the bands 14-19.95 kHz and 20.05-70 kHz and in Region 1 also the bands 72-84 kHz and 86-90 kHz are allocated may transmit standard frequency and time signals. Such stations shall be afforded protection from harmful interference. In Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions.

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5.68 Alternative allocation: in Angola, Burundi, Congo (Rep. of the), Malawi, Dem. Rep. of the Congo, Rwanda and South Africa, the band 160-200 kHz is allocated to the fixed service on a primary basis.

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5.70 Alternative allocation: in Angola, Botswana, Burundi, Cameroon, the Central African Rep., Congo (Rep. of the), Ethiopia, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Oman, Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Tanzania, Chad, Zambia and Zimbabwe, the band 200-283.5 kHz is allocated to the aeronautical radionavigation service on a primary basis.

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5.87 Additional allocation: in Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland and Zimbabwe, the band 526.5-535 kHz is also allocated to the mobile service on a secondary basis.

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5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Denmark, Estonia, the Russian Federation, Finland, Georgia, Hungary, Ireland, Iceland, Israel, Kazakhstan, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Norway, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the United Kingdom, Sweden, Switzerland, Tajikistan, Turkmenistan and Ukraine, administrations may allocate up to 200 kHz to their amateur service in the bands 1715-1800 kHz and 1850-2000 kHz. However, when allocating the bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 W.

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5.98 Alternative allocation: in Angola, Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Cameroon, Congo (Rep. of the), Denmark, Egypt, Eritrea, Spain, Ethiopia, the Russian Federation, Georgia, Greece, Italy, Kazakhstan, Lebanon, Lithuania, Moldova, Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Tunisia, Turkmenistan, Turkey and Ukraine, the band 1810-1830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.99 Additional allocation: in Saudi Arabia, Austria, Bosnia and Herzegovina, Iraq, Libyan Arab Jamahiriya, Uzbekistan, Slovakia, Romania, Serbia and Montenegro, Slovenia, Chad, and Togo, the band 1810-1830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

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5.107 Additional allocation: in Saudi Arabia, Eritrea, Ethiopia, Iraq, Lesotho, Libyan Arab Jamahiriya, Somalia and Swaziland, the band 2160-2170 kHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. The mean power of stations in these services shall not exceed 50 W.

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5.112 Alternative allocation: in Bosnia and Herzegovina, Denmark, Malta, Serbia and Montenegro, and Sri Lanka, the band 2194-2300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

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5.114 Alternative allocation: in Bosnia and Herzegovina, Denmark, Iraq, Malta, and Serbia and Montenegro, the band 2502-2625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis

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5.117 Alternative allocation: in Bosnia and Herzegovina, Côte d'Ivoire, Denmark, Egypt, Liberia, Malta, Serbia and Montenegro, Sri Lanka and Togo, the band 3155-3200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis

5.118 Additional allocation: in the United States, Mexico, Peru and Uruguay, the band 3230-3400 kHz is also allocated to the radiolocation service on a secondary basis.

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5.134 The use of the bands 5900-5950 kHz, 7300-7350 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz and 18900-19020 kHz by the broadcasting service as from 1 April 2007 is subject to the application of the procedure of Article 12. Administrations are urged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution 517 (Rev.WRC-03).

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5.138A Until 29 March 2009, the band 6765-7000 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis.

5.139 Different category of service: until 29 March 2009, in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 6765-7000 kHz to the land mobile service is on a primary basis (see No. 5.33).

5.140 Additional allocation: in Angola, Iraq, Kenya, Rwanda, Somalia and Togo, the band 7000-7050 kHz is also allocated to the fixed service on a primary basis.

5.141A Additional allocation: in Uzbekistan and Kyrgyzstan, the bands 7000-7100 kHz and 7100-7200 kHz are also allocated to the fixed and land mobile services on a secondary basis.

5.141B Additional allocation: after 29 March 2009, in Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, Libyan Arab Jamahiriya, Morocco, Mauritania, New Zealand, Oman, Papua New Guinea, Qatar, Syrian Arab Republic, Singapore, Sudan, Tunisia, Viet Nam and Yemen, the band 7100-7200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis.

5.141C In Regions 1 and 3, the band 7100-7200 kHz is allocated to the broadcasting service until 29 March 2009 on a primary basis.

5.142 Until 29 March 2009, the use of the band 7100-7300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3. After 29 March 2009 the use of the band 7200-7300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3.

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5.143A In Region 3, the band 7350-7450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations.

5.143B In Region 1, the band 7350-7450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, on condition that harmful interference is not caused to the broadcasting service, frequencies in the band 7350-7450 kHz may be used by stations in the fixed and land mobile services communicating only within the boundary of the country in which they are located, each station using a total radiated power that shall not exceed 24 dBW.

5.143C Additional allocation: after 29 March 2009 in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), Jordan, Kuwait, Libyan Arab Jamahiriya, Morocco, Mauritania, Oman, Qatar, Syrian Arab Republic, Sudan, Tunisia and Yemen, the bands 7350-7400 kHz and 7400-7450 kHz are also allocated to the fixed service on a primary basis.

5.143D In Region 2, the band 7350-7400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations.

5.143E Until 29 March 2009, the band 7450-8100 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis.

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5.152 Additional allocation: in Armenia, Azerbaijan, China, Côte d'Ivoire, the Russian Federation, Georgia, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 14250-14350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW.

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5.154 Additional allocation: in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 18068-18168 kHz is also allocated to the fixed service on a primary basis for use within their boundaries, with a peak envelope power not exceeding 1 kW.

5.155 Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Turkmenistan and Ukraine, the band 21850-21870 kHz is also allocated to the aeronautical mobile (R) services on a primary basis.

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5.163 Additional allocation: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Turkmenistan and Ukraine, the bands 47-48.5 MHz and 56.5-58 MHz are also allocated to the fixed and land mobile services on a secondary basis.

5.164 Additional allocation: in Albania, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, Jordan, Lebanon, Libyan Arab Jamahiriya, Liechtenstein, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, the United Kingdom, Serbia and Montenegro, Slovenia, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the band 47-68 MHz, in Romania the band 47-58 MHz, in South Africa the band 47-50 MHz, and in the Czech Rep. the band 66-68 MHz, are also allocated to the land mobile service on a primary basis. However, stations of the land mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations of countries other than those mentioned in connection with the band.

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5.174 Alternative allocation: in Bulgaria, Hungary and Romania, the band 68-73 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions in the Final Acts of the Special Regional Conference (Geneva, 1960).

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5.177 Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Latvia, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 73-74 MHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. 9.21.

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5.179 Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Moldova, Mongolia, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the bands 74.6-74.8 MHz and 75.2-75.4 MHz are also allocated to the aeronautical radionavigation service, on a primary basis, for ground-based transmitters only.

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5.181 Additional allocation: in Egypt, Israel and Syrian Arab Republic, the band 74.8-75.2 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. 9.21. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. 9.21.

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5.203B Additional allocation: in Saudi Arabia, United Arab Emirates, Oman and Syrian Arab Republic, the band 136-137 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis until 1 January 2005.

5.204 Different category of service: in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Bosnia and Herzegovina, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Malaysia, Oman, Pakistan, the Philippines, Qatar, Serbia and Montenegro, Singapore, Thailand and Yemen, the band 137-138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (see No. 5.33).

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5.210 Additional allocation: in France, Italy, the Czech Rep. and the United Kingdom, the bands 138-143.6 MHz and 143.65-144 MHz are also allocated to the space research service (space-to-Earth) on a secondary basis.

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5.212 Alternative allocation: in Angola, Botswana, Burundi, Cameroon, the Central African Rep., Congo (Rep. of the), Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Lesotho, Liberia, Libyan Arab Jamahiriya, Malawi, Mozambique, Namibia, Oman, Uganda, Dem. Rep. of the Congo, Rwanda, Sierra Leone, South Africa, Swaziland, Chad, Togo, Zambia and Zimbabwe, the band 138-144 MHz is allocated to the fixed and mobile services on a primary basis.

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5.221 Stations of the mobile-satellite service in the band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, the Russian Federation, Finland, France, Gabon, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Libyan Arab Jamahiriya, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, Syrian Arab Republic, Kyrgyzstan, Slovakia, Romania, the United Kingdom, Senegal, Serbia and Montenegro, Sierra Leone, Singapore, Slovenia, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Zambia, and Zimbabwe.

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5.237 Additional allocation: in Congo (Rep. of the), Eritrea, Ethiopia, Gambia, Guinea, Libyan Arab Jamahiriya, Malawi, Mali, Sierra Leone, Somali, Chad and Zimbabwe, the band 174-223 MHz is also allocated to the fixed and mobile services on a secondary basis.

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5.254 The bands 235-322 MHz and 335.4-399.9 MHz may be used by the mobile-satellite service, subject to agreement obtained under No. 9.21, on condition that stations in this service do not cause harmful interference to those of other services operating or planned to be operated in accordance with the Table of Frequency Allocations except for the additional allocation made in footnote No. 5.256A.

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5.256A Additional allocation: in China, the Russian Federation, Kazakhstan and Ukraine, the band 258-261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, nor claim protection from, nor constrain the use and development of the mobile service systems and mobile-satellite service systems operating in the band. Stations in space research service (Earth-to-space) and space operation service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries.

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5.262 Additional allocation: in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Botswana, Bulgaria, Colombia, Costa Rica, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Uzbekistan, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, Romania, Serbia and Montenegro, Singapore, Somalia, Tajikistan, Turkmenistan and Ukraine, the band 400.05-401 MHz is also allocated to the fixed and mobile services on a primary basis.

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5.271 Additional allocation: in Azerbaijan, Belarus, China, India, Latvia, Lithuania, Kyrgyzstan and Turkmenistan, the band 420-460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis.

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5.273 Different category of service: in Libyan Arab Jamahiriya, the allocation of the bands 430-432 MHz and 438-440 MHz to the radiolocation service is on a secondary basis (see No. 5.32).

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5.277 Additional allocation: in Angola, Armenia, Azerbaijan, Belarus, Cameroon, Congo (Rep. of the), Djibouti, the Russian Federation, Georgia, Hungary, Israel, Kazakhstan, Mali, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the band 430-440 MHz is also allocated to the fixed service on a primary basis.

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5.279A The use of this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R SA.1260-1. Additionally, the Earth exploration-satellite service (active) in the band 432-438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China.

The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. 5.29 and 5.30.

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5.288 In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-1.

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5.294 Additional allocation: in Burundi, Cameroon, Congo (Rep. of the), Côte d'Ivoire, Ethiopia, Israel, Kenya, Lebanon, Libyan Arab Jamahiriya, Malawi, Syrian Arab Republic, Sudan, Chad and Yemen, the band 470-582 MHz is also allocated to the fixed service on a secondary basis.

5.296 Additional allocation: in Germany, Austria, Belgium, Côte d'Ivoire, Denmark, Spain, Finland, France, Ireland, Israel, Italy, Libyan Arab Jamahiriya, Lithuania, Malta, Morocco, Monaco, Norway, the Netherlands, Portugal, Syrian Arab Republic, the United Kingdom, Sweden, Switzerland, Swaziland and Tunisia, the band 470-790 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote.

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5.311 Within the frequency band 620-790 MHz, assignments may be made to television stations using frequency modulation in the broadcasting-satellite service subject to agreement between the

administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Resolutions 33 (Rev.WRC-03) and 507 (Rev.WRC-03)). Such stations shall not produce a power flux-density in excess of the value $-129 \text{ dB(W/m}^2\text{)}$ for angles of arrival less than 20° (see Recommendation 705) within the territories of other countries without the consent of the administrations of those countries. Resolution 545 (WRC-03) applies.

5.312 Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 645-862 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

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5.316 Additional allocation: in Germany, Saudi Arabia, Bosnia and Herzegovina, Burkina Faso, Cameroon, Côte d'Ivoire, Croatia, Denmark, Egypt, Finland, Greece, Israel, Jordan, Kenya, The Former Yugoslav Republic of Macedonia, Libyan Arab Jamahiriya, Liechtenstein, Mali, Monaco, Norway, the Netherlands, Portugal, the United Kingdom, Syrian Arab Republic, Serbia and Montenegro, Sweden and Switzerland, the band 790-830 MHz, and in these same countries and in Spain, France, Gabon and Malta, the band 830-862 MHz, are also allocated to the mobile, except aeronautical mobile, service on a primary basis. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band.

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5.323 Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 862-960 MHz is also allocated to the aeronautical radionavigation service on a primary basis. Such use is subject to agreement obtained under No. 9.21 with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime.

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5.328A Stations in the radionavigation-satellite service in the band 1164-1215 MHz shall operate in accordance with the provisions of Resolution 609 (WRC-03) and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1215 MHz. No. 5.43A does not apply. The provisions of No. 21.18 shall apply.

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5.329 Use of the radionavigation-satellite service in the band 1215-1300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215-1300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. 5.43 shall not apply in respect of the radiolocation service. Resolution 608 (WRC-03) shall apply.

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5.330 Additional allocation: in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Mozambique, Nepal, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the band 1215-1300 MHz is also allocated to the fixed and mobile services on a primary basis.

5.331 Additional allocation: in Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Egypt, the United Arab Emirates, Estonia, the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Mauritania, Nigeria, Norway, Oman, the Netherlands, Poland, Portugal, Qatar, Syrian Arab Republic, Slovakia, the United Kingdom, Serbia and Montenegro, Slovenia, Somalia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Turkey, Venezuela and Viet Nam, the band 1215-1300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the band 1240-1300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service.

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5.334 Additional allocation: in Canada and the United States, the band 1350-1370 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

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5.338 In Azerbaijan, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Romania and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1350-1400 MHz.

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5.339A Additional allocation: the band 1390-1392 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a secondary basis and the band 1430-1432 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis. These allocations are limited to use for feeder links for non-geostationary-satellite networks in the mobile-satellite service with service links below 1 GHz, and Resolution 745 (WRC-03) applies.

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5.347 Different category of service: in Bangladesh, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cuba, Denmark, Egypt, Greece, Ireland, Italy, Mozambique, Portugal, Serbia and Montenegro, Sri Lanka, Swaziland, Yemen and Zimbabwe, the allocation of the band 1452-1492 MHz to the broadcasting-satellite service and the broadcasting service is on a secondary basis until 1 April 2007.

5.347A In the bands:

1452-1492 MHz,
1525-1559 MHz,
1613.8-1626.5 MHz,
2655-2670 MHz,
2670-2690 MHz,
21.4-22 GHz,

Resolution 739 (WRC-03) applies.

5.348 The use of the band 1518-1525 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. In the band 1518-1525 MHz stations in the mobile-satellite service shall not claim protection from the stations in the fixed service. No. 5.43A does not apply.

5.348A In the band 1518-1525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. 9.11A for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be -150 dB(W/m²) in any 4 kHz band for all angles of arrival, instead of those given in Table 5-2 of Appendix 5. In the band 1518-1525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. 5.43A does not apply.

5.348B In the band 1518-1525 MHz, stations in the mobile-satellite service shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. 5.343 and 5.344) and in the countries listed in No. 5.342. No. 5.43A does not apply.

5.348C For the use of the bands 1518-1525 MHz and 1668-1675 MHz by the mobile-satellite service, see Resolution 225 (Rev.WRC-03).

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5.355 Additional allocation: in Bahrain, Bangladesh, Congo (Rep. of the), Egypt, Eritrea, Iraq, Israel, Kuwait, Lebanon, Malta, Qatar, Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the bands 1540-1559 MHz, 1610-1645.5 MHz and 1646.5-1660 MHz are also allocated to the fixed service on a secondary basis.

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5.359 Additional allocation: in Germany, Saudi Arabia, Armenia, Austria, Azerbaijan, Belarus, Benin, Bosnia and Herzegovina, Bulgaria, Cameroon, Spain, the Russian Federation, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, Hungary, Jordan, Kazakhstan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Lithuania, Mauritania, Moldova, Mongolia, Uganda, Uzbekistan, Pakistan, Poland, Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Swaziland, Tajikistan, Tanzania, Tunisia, Turkmenistan and Ukraine, the bands 1550-1559 MHz, 1610-1645.5 MHz and 1646.5-1660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these bands.

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5.362B Additional allocation: The band 1559-1610 MHz is also allocated to the fixed service on a primary basis until 1 January 2005 in Germany, Armenia, Azerbaijan, Belarus, Benin, Bosnia and Herzegovina, Bulgaria, Spain, the Russian Federation, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, Hungary, Kazakhstan, Lithuania, Moldova, Mongolia, Nigeria, Uganda, Uzbekistan, Pakistan, Poland, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Senegal, Swaziland, Tajikistan, Tanzania, Turkmenistan and Ukraine, and until 1 January 2010 in Saudi Arabia, Cameroon, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Mali, Mauritania, Syrian Arab Republic and Tunisia. After these dates, the fixed service may continue to operate on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and the aeronautical radionavigation service and not authorize new frequency assignments to fixed-service systems in this band.

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5.369 Different category of service: in Angola, Australia, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, Lebanon, Liberia, Libyan Arab Jamahiriya, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, Dem. Rep. of the Congo, Sudan, Swaziland, Togo and Zambia, the allocation of the band 1610-1626.5 MHz to the radiodetermination-satellite service (Earth-to-space) is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21 from countries not listed in this provision.

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5.379B The use of the band 1668-1675 MHz by the mobile-satellite service is subject to coordination under No. 9.11A.

5.379C In order to protect the radio astronomy service in the band 1668-1670 MHz, the aggregate power flux-density (pfd) values produced by mobile earth stations in a network of the mobile-satellite service operating in this band shall not exceed -181 dB(W/m²) in 10 MHz and -194 dB(W/m²) in any 20 kHz at any radio astronomy station recorded in the Master International Frequency Register, for more than 2% of integration periods of 2000 s.

5.379D For sharing of the band 1668-1675 MHz between the mobile-satellite service and the fixed, mobile and space research (passive) services, Resolution 744 (WRC-03) shall apply.

5.379E In the band 1668.4-1675 MHz, stations in the mobile-satellite service shall not cause harmful interference to stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan. In the band 1668.4-1675 MHz, administrations are urged not to implement new systems in the meteorological aids service and are encouraged to migrate existing meteorological aids service operations to other bands as soon as practicable.

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5.380A In the band 1670-1675 MHz, stations in the mobile-satellite service shall not cause harmful interference to, nor constrain the development of, existing earth stations in the meteorological-satellite service notified in accordance with Resolution 670 (WRC-03).

5.381 Additional allocation: in Afghanistan, Costa Rica, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1690-1700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.382 Different category of service: in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Bulgaria, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Hungary, Iraq, Israel, Jordan, Kazakhstan, Kuwait, the Former Yugoslav Republic of Macedonia, Lebanon, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, Syrian Arab Republic, Kyrgyzstan, Romania, Serbia and Montenegro, Somalia, Tajikistan, Tanzania, Turkmenistan, Ukraine and Yemen, the allocation of the band 1690-1700 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33), and in the Dem. People's Rep. of Korea, the allocation of the band 1690-1700 MHz to the fixed service is on a primary basis (see No. 5.33) and to the mobile, except aeronautical mobile, service on a secondary basis.

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5.386 Additional allocation: the band 1750-1850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2, in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. 9.21, having particular regard to troposcatter systems.

5.387 Additional allocation: in Azerbaijan, Belarus, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, Romania, Tajikistan and Turkmenistan, the band 1770-1790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under No. 9.21.

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5.388A In Regions 1 and 3, the bands 1885-1980 MHz, 2010-2025 MHz and 2110-2170 MHz and, in Region 2, the bands 1885-1980 MHz and 2110-2160 MHz may be used by high altitude platform stations as base stations to provide International Mobile Telecommunications-2000 (IMT-2000), in accordance with Resolution 221 (Rev.WRC-03). Their use by IMT-2000 applications using high altitude platform stations as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations.

5.388B In Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Qatar, Syrian Arab Republic, Senegal, Singapore, Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT-2000 mobile stations, in their territories from co-channel interference, a HAPS operating as an IMT-2000 base station in neighbouring countries, in the bands referred to in No. 5.388A, shall not exceed a co-channel power flux-density of $-127 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS.

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5.395 In France and Turkey, the use of the band 2310-2360 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

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5.400 Different category of service: in Angola, Australia, Bangladesh, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Lebanon, Liberia, Libyan Arab Jamahiriya, Madagascar, Mali, Pakistan, Papua New Guinea, Dem. Rep. of the Congo, Syrian Arab Republic, Sudan, Swaziland, Togo and Zambia, the allocation of the band 2483.5-2500 MHz to the radiodetermination-satellite service (space-to-Earth) is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21 from countries not listed in this provision.

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5.416 The use of the band 2520-2670 MHz by the broadcasting-satellite service is limited to national and regional systems for community reception, subject to agreement obtained under No. 9.21.

5.418 Additional allocation: in Korea (Rep. of), India, Japan, Pakistan and Thailand, the band 2535-2655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-03). The provisions of No. 5.416 and Table 21-4 of Article 21, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution 539 (Rev.WRC-03). Geostationary broadcasting-satellite service (sound) systems for which complete Appendix 4 coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2630-2655 MHz, and for which complete Appendix 4 coordination information has been received after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

$-130 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $0^\circ \leq \theta \leq 5^\circ$
$-130 + 0.4 (\theta - 5) \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $5^\circ < \theta \leq 25^\circ$
$-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of $-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ shall be used as a threshold for coordination under No. 9.11 in an area of 1500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system. In addition, the pfd value shall not exceed $-100 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ anywhere on the territory of the Russian Federation.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416 for systems for which complete Appendix 4 coordination information has been received after 1 June 2005.

5.418AA In applying provision No. 5.418, in Korea (Rep. of) and Japan, resolves 3 of Resolution 528 (Rev.WRC-03) is relaxed to allow the broadcasting-satellite service (sound) and the complementary terrestrial broadcasting service to additionally operate on a primary basis in the band 2605-2630 MHz. This use is limited to systems intended for national coverage. An administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416. The provisions of No. 5.416 and Table 21-4 of Article 21 do not apply. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) in the band 2605-2630 MHz is subject to the provisions of Resolution 539 (Rev.WRC-03). The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2605-2630 MHz for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, for all conditions and for all methods of modulation, shall not exceed the following limits:

$-130 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $0^\circ \leq \theta \leq 5^\circ$
$-130 + 0.4 (\theta - 5) \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $5^\circ < \theta \leq 25^\circ$
$-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for $25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. In the case of the broadcasting-satellite service (sound) networks of Korea (Rep. of), as an exception to the limits above, the pfd value of $-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ shall be used as a threshold for coordination under No. 9.11 in an area of 1000 km around the territory of the administration notifying the BSS (sound) system, for angles of arrival greater than 35° .

5.418AB In Korea (Rep. of) and Japan, use of the band 2605-2630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418AA, for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. 9.12A, in respect of geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received after 4 July 2003, and No. 22.2 does not apply. No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received before 5 July 2003.

5.418AC Use of the band 2605-2630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418AA, for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. 9.12.

5.418AD Use of the band 2605-2630 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003 is subject to the application of the provisions of No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418AA, and No. 22.2 does not apply.

5.418A In certain Region 3 countries listed in No. 5.418, use of the band 2630-2655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12A, in respect of geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received after 2 June 2000, and No. 22.2 does not apply. No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received before 3 June 2000.

5.418B Use of the band 2630-2655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418, for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12.

5.418C Use of the band 2630-2655 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418 and No. 22.2 does not apply.

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5.422 Additional allocation: in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Lebanon, Mauritania, Moldova, Mongolia, Nigeria, Oman, Uzbekistan, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Serbia and Montenegro, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine and

Yemen, the band 2690-2700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985.

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5.424A In the band 2900-3100 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the radionavigation service.

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5.428 Additional allocation: in Azerbaijan, Cuba, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3100-3300 MHz is also allocated to the radionavigation service on a primary basis.

5.429 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Congo (Rep. of the), Korea (Rep. of), the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kenya, Kuwait, Lebanon, Libyan Arab Jamahiriya, Malaysia, Oman, Pakistan, Qatar, Syrian Arab Republic, Dem. People's Rep. of Korea and Yemen, the band 3300-3400 MHz is also allocated to the fixed and mobile services on a primary basis. The countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service.

5.430 Additional allocation: in Azerbaijan, Cuba, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3300-3400 MHz is also allocated to the radionavigation service on a primary basis.

5.431 Additional allocation: in Germany, Israel and the United Kingdom, the band 3400-3475 MHz is also allocated to the amateur service on a secondary basis.

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5.443B In order not to cause harmful interference to the microwave landing system operating above 5030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5030-5150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5010-5030 MHz shall not exceed $-124.5 \text{ dB(W/m}^2\text{)}$ in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the band 4990-5000 MHz, radionavigation-satellite service systems operating in the band 5010-5030 MHz shall comply with the limits in the band 4990-5000 MHz defined in Resolution 741 (WRC-03).

5.444 The band 5030-5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of this band. For the use of this band, No. 5.444A and Resolution 114 (Rev.WRC-03) apply.

5.444A Additional allocation: the band 5091-5150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A.

In the band 5091-5150 MHz, the following conditions also apply:

- prior to 1 January 2018, the use of the band 5091-5150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (Rev.WRC-03);
- prior to 1 January 2018, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5000-5091 MHz band, shall take precedence over other uses of this band;
- after 1 January 2012, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;

- after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service.

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5.447E Additional allocation: The band 5250-5350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, Philippines, Sri Lanka, Thailand and Viet Nam. The use of this band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU-R F.1613. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. 5.43A do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodetermination implementations.

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5.453 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Egypt, the United Arab Emirates, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kenya, Kuwait, Lebanon, the Libyan Arab Jamahiriya, Madagascar, Malaysia, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sri Lanka, Swaziland, Tanzania, Chad, Thailand, Togo, Viet Nam and Yemen, the band 5650-5850 MHz is also allocated to the fixed and mobile services on a primary basis. In this case, the provisions of Resolution 229 (WRC-03) do not apply.

5.454 Different category of service: in Azerbaijan, the Russian Federation, Georgia, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 5670-5725 MHz to the space research service is on a primary basis (see No. 5.33).

5.455 Additional allocation: in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 5670-5850 MHz is also allocated to the fixed service on a primary basis.

5.456 Additional allocation: in Cameroon, the band 5755-5850 MHz is also allocated to the fixed service on a primary basis.

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5.460 The use of the band 7145-7190 MHz by the space research service (Earth-to-space) is restricted to deep space; no emissions to deep space shall be effected in the band 7190-7235 MHz. Geostationary satellites in the space research service operating in the band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply.

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5.466 Different category of service: in Israel, Singapore and Sri Lanka, the allocation of the band 8400-8500 MHz to the space research service is on a secondary basis (see No. 5.32).

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5.468 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libyan Arab Jamahiriya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, Qatar, Syrian Arab Republic, Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Swaziland, Tanzania, Chad, Togo,

Tunisia and Yemen, the band 8500-8750 MHz is also allocated to the fixed and mobile services on a primary basis.

5.469 Additional allocation: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 8500-8750 MHz is also allocated to the land mobile and radionavigation services on a primary basis.

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5.473 Additional allocation: in Armenia, Austria, Azerbaijan, Belarus, Bulgaria, Cuba, the Russian Federation, Georgia, Hungary, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the bands 8850-9000 MHz and 9200-9300 MHz are also allocated to the radionavigation service on a primary basis.

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5.477 Different category of service: in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Pakistan, Qatar, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Trinidad and Tobago, and Yemen, the allocation of the band 9800-10000 MHz to the fixed service is on a primary basis (see No. 5.33).

5.478 Additional allocation: in Azerbaijan, Bulgaria, Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 9800-10000 MHz is also allocated to the radionavigation service on a primary basis.

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5.481 Additional allocation: in Germany, Angola, Brazil, China, Costa Rica, Côte d'Ivoire, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Paraguay, Peru, the Dem. People's Rep. of Korea, Tanzania, Thailand and Uruguay, the band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis.

5.482 In the band 10.6-10.68 GHz, stations of the fixed and mobile, except aeronautical mobile, services shall be limited to a maximum equivalent isotropically radiated power of 40 dBW and the power delivered to the antenna shall not exceed -3 dBW. These limits may be exceeded subject to agreement obtained under No. 9.21. However, in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, China, the United Arab Emirates, Georgia, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Kuwait, Latvia, Lebanon, Moldova, Nigeria, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Tajikistan and Turkmenistan, the restrictions on the fixed and mobile, except aeronautical mobile, services are not applicable.

5.483 Additional allocation: in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, China, Colombia, Korea (Rep. of), Costa Rica, Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Uzbekistan, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Serbia and Montenegro, Tajikistan, Turkmenistan and Yemen, the band 10.68-10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985.

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5.487 In the band 11.7-12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan in Appendix 30.

5.487A Additional allocation: in Region 1, the band 11.7-12.5 GHz, in Region 2, the band 12.2-12.7 GHz and, in Region 3, the band 11.7-12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

5.488 The use of the band 11.7-12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 is subject to application of the provisions of No. 9.14 for coordination with stations of terrestrial services in Regions 1, 2 and 3. For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix 30.

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5.494 Additional allocation: in Algeria, Angola, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), Côte d'Ivoire, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Madagascar, Mali, Morocco, Mongolia, Nigeria, Qatar, Syrian Arab Republic, Dem. Rep. of the Congo, Somalia, Sudan, Chad, Togo and Yemen, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.495 Additional allocation: in Bosnia and Herzegovina, Croatia, France, Greece, Liechtenstein, Monaco, Uganda, Portugal, Romania, Serbia and Montenegro, Slovenia, Switzerland, Tanzania and Tunisia, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis.

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5.500 Additional allocation: in Algeria, Angola, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Malta, Morocco, Mauritania, Nigeria, Pakistan, Qatar, Syrian Arab Republic, Singapore, Sudan, Chad and Tunisia, the band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis.

5.501 Additional allocation: in Azerbaijan, Hungary, Japan, Mongolia, Kyrgyzstan, Romania, the United Kingdom and Turkmenistan, the band 13.4-14 GHz is also allocated to the radionavigation service on a primary basis.

5.502 In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in a geostationary-satellite network in the fixed-satellite service in this band with an antenna size smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

- $-115 \text{ dB(W/(m}^2 \cdot 10 \text{ MHz))}$ for more than 1% of the time produced at 36 m above sea level at the low water mark, as officially recognized by the coastal state;
- $-115 \text{ dB(W/(m}^2 \cdot 10 \text{ MHz))}$ for more than 1% of the time produced 3 m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW.

5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

- in the band 13.77-13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:
 - i) $4.7\bar{D} + 28 \text{ dB(W/40 kHz)}$, where \bar{D} is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;
 - ii) $49.2 + 20 \log(\bar{D}/4.5) \text{ dB(W/40 kHz)}$, where \bar{D} is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;
 - iii) $66.2 \text{ dB(W/40 kHz)}$ for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;
 - iv) 56.2 dB(W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;
- the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions.

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5.504C In the band 14-14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Lesotho, Nigeria, Oman, Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29.

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5.505 Additional allocation: in Algeria, Angola, Saudi Arabia, Bahrain, Bangladesh, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lesotho, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad and Yemen, the band 14-14.3 GHz is also allocated to the fixed service on a primary basis.

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5.506A In the band 14-14.5 GHz, ship earth stations with an e.i.r.p. greater than 21 dBW shall operate under the same conditions as earth stations located on board vessels, as provided in Resolution 902 (WRC-03). This footnote shall not apply to ship earth stations for which the complete Appendix 4 information has been received by the Bureau prior to 5 July 2003.

5.506B Earth stations located on board vessels communicating with space stations in the fixed-satellite service may operate in the frequency band 14-14.5 GHz without the need for prior agreement from Cyprus, Greece and Malta, within the minimum distance given in Resolution 902 (WRC-03) from these countries.

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5.508 Additional allocation: in Germany, Bosnia and Herzegovina, France, Italy, The Former Yugoslav Rep. of Macedonia, Libyan Arab Jamahiriya, the United Kingdom, Serbia and Montenegro and Slovenia, the band 14.25-14.3 GHz is also allocated to the fixed service on a primary basis.

5.508A In the band 14.25-14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, Nigeria, Oman, Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29.

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5.509A In the band 14.3-14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, Morocco, Nigeria, Oman, Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. 5.29.

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5.512 Additional allocation: in Algeria, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Bosnia and Herzegovina, Brunei Darussalam, Cameroon, Congo (Rep. of the), Costa Rica, Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), Jordan, Kenya, Kuwait, Libyan Arab Jamahiriya, Malaysia, Mali, Morocco, Mauritania, Mozambique, Nepal, Nicaragua, Oman, Pakistan, Qatar, Serbia and Montenegro, Singapore, Slovenia, Somalia, Sudan, Swaziland, Tanzania, Chad, Togo and Yemen, the band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis.

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5.514 Additional allocation: in Algeria, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Bosnia and Herzegovina, Cameroon, Costa Rica, El Salvador, the United Arab Emirates, Finland, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kuwait, Libyan Arab Jamahiriya, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan, Serbia and Montenegro, Slovenia and Sudan, the band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. 21.3 and 21.5 shall apply.

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5.516A In the band 17.3-17.7 GHz, earth stations of the fixed-satellite service (space-to-Earth) in Region 1 shall not claim protection from the broadcasting-satellite service feeder-link earth stations operating under Appendix 30A, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link.

5.516B The following bands are identified for use by high-density applications in the fixed-satellite service:

17.3-17.7 GHz	(space-to-Earth) in Region 1,
18.3-19.3 GHz	(space-to-Earth) in Region 2,
19.7-20.2 GHz	(space-to-Earth) in all Regions,
39.5-40 GHz	(space-to-Earth) in Region 1,
40-40.5 GHz	(space-to-Earth) in all Regions,
40.5-42 GHz	(space-to-Earth) in Region 2,
47.5-47.9 GHz	(space-to-Earth) in Region 1,
48.2-48.54 GHz	(space-to-Earth) in Region 1,
49.44-50.2 GHz	(space-to-Earth) in Region 1,
and	
27.5-27.82 GHz	(Earth-to-space) in Region 1,
28.35-28.45 GHz	(Earth-to-space) in Region 2,
28.45-28.94 GHz	(Earth-to-space) in all Regions,
28.94-29.1 GHz	(Earth-to-space) in Region 2 and 3,
29.25-29.46 GHz	(Earth-to-space) in Region 2,
29.46-30 GHz	(Earth-to-space) in all Regions,
48.2-50.2 GHz	(Earth-to-space) in Region 2.

This identification does not preclude the use of these bands by other fixed-satellite service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in these Regulations among users of the bands. Administrations should take this into account when considering regulatory provisions in relation to these bands. See Resolution 143 (WRC-03).

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5.521 Alternative allocation: in Germany, Denmark, the United Arab Emirates and Greece, the band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. 5.33). The provisions of No. 5.519 also apply.

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5.536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account Recommendations ITU-R SA.1278 and ITU-R SA.1625, respectively.

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5.536C In Algeria, Saudi Arabia, Bahrain, Botswana, Brazil, Cameroon, Comoros, Cuba, Djibouti, Egypt, United Arab Emirates, Estonia, Finland, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lithuania, Malaysia, Morocco, Nigeria, Oman, Qatar, Syrian Arab Republic, Somalia, Sudan, Tanzania, Tunisia, Uruguay, Zambia and Zimbabwe, earth stations operating in the space research service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services.

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5.537A In Bhutan, Korea (Rep. of), the Russian Federation, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.5-28.35 GHz may also be used by high altitude platform stations (HAPS). The use of HAPS within the band 27.5-28.35 GHz is limited, within the territory of the countries listed above, to a single 300 MHz sub-band. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See Resolution 145 (WRC-03).

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5.543A In Bhutan, Korea (Rep. of), the Russian Federation, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 31-31.3 GHz may also be used by systems using high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the band 31-31.3 GHz by systems using HAPS is limited to the territory of the countries listed above and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems, systems in the mobile service and systems operated under No. 5.545. Furthermore, the development of these services shall not be constrained by HAPS. Systems using HAPS in the band 31-31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the band 31.3-31.8 GHz, taking into account the protection criterion as given in Recommendation ITU-R RA.769. In order to ensure the protection of satellite passive services, the level of unwanted power density into a HAPS ground station antenna in the band 31.3-31.8 GHz shall be limited to -106 dB(W/MHz) under clear-sky conditions, and may be increased up to -100 dB(W/MHz) under rainy conditions to take account of rain attenuation, provided the effective impact on the passive satellite does not exceed the impact under clear-sky conditions as given above. See Resolution 145 (WRC-03).

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5.545 Different category of service: in Armenia, Azerbaijan, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 31-31.3 GHz to the space research service is on a primary basis (see No. 5.33).

5.546 Different category of service: in Saudi Arabia, Armenia, Azerbaijan, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Finland, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Latvia, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Syrian Arab Republic, Kyrgyzstan, Romania, the United Kingdom, South Africa, Tajikistan, Turkmenistan and Turkey, the allocation of the band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33).

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5.547C Alternative allocation: in the United States, the band 32-32.3 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis.

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5.548 In designing systems for the inter-satellite service in the band 32.3-33 GHz, for the radionavigation service in the band 32-33 GHz, and for the space research service (deep space) in the band 31.8-32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (see Recommendation 707).

5.549 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Malaysia, Mali, Malta, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Dem. Rep. of the Congo, Singapore, Somalia, Sudan, Sri Lanka, Togo, Tunisia and Yemen, the band 33.4-36 GHz is also allocated to the fixed and mobile services on a primary basis.

5.549A In the band 35.5-36.0 GHz, the mean power flux-density at the Earth's surface, generated by any spaceborne sensor in the Earth exploration-satellite service (active) or space research service (active), for any angle greater than 0.8° from the beam centre shall not exceed $-73.3 \text{ dB(W/m}^2\text{)}$ in this band.

5.550 Different category of service: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 34.7-35.2 GHz to the space research service is on a primary basis (see No. 5.33).

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5.551I The power flux-density in the band 42.5-43.5 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth), or the broadcasting-satellite service (space-to-Earth) operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:

– $-137 \text{ dB(W/m}^2\text{)}$ in 1 GHz and $-153 \text{ dB(W/m}^2\text{)}$ in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

– $-116 \text{ dB(W/m}^2\text{)}$ in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:

- was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC-03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed.

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5.555B The power flux-density in the band 48.94-49.04 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth) operating in the bands 48.2-48.54 GHz and 49.44-50.2 GHz shall not exceed $-151.8 \text{ dB(W/m}^2\text{)}$ in any 500 kHz band at the site of any radio astronomy station.

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UNITED STATES (US) FOOTNOTES

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US252 The band 2110-2120 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a primary basis at Goldstone, California.

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US258 In the bands 8025-8400 MHz and 25.5-27 GHz, the Earth exploration-satellite service (space-to-Earth) is allocated on a primary basis for non-Federal Government use. Authorizations are subject to a case-by-case electromagnetic compatibility analysis.

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US262 The band 7145-7190 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a secondary basis for non-Federal Government use. The use of the bands 7145-7190 MHz and 34.2-34.7 GHz by the space research service (deep space) (Earth-to-space) and of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) is limited to Goldstone, California.

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US310 In the band 14.896-15.121 GHz, non-Federal Government space stations in the space research service may be authorized on a secondary basis to transmit to Tracking and Data Relay Satellites subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal Government stations. The power flux-density produced by such non-Federal Government stations at the Earth's surface in any 1 MHz band for all conditions and methods of modulation shall not exceed:

- 124 dB(W/m²) for $0^\circ < \theta \leq 5^\circ$
- 124 + ($\theta - 5$)/2 dB(W/m²) for $5^\circ < \theta \leq 25^\circ$
- 114 dB(W/m²) for $25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizontal). These limits relate to the power flux-density and angles of arrival which would be obtained under free-space propagation conditions.

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US352 In the band 1427-1432 MHz, Federal Government operations, except for medical telemetry and medical telecommand operations, are on a non-interference basis to authorized non-Federal Government operations and shall not hinder the implementation of any non-Federal Government operations.

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US366 On April 1, 2007, the bands 5900-5950 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz, and 18900-19020 kHz shall be allocated exclusively to the broadcasting service. After April 1, 2007, frequencies in these bands may be used by stations in the fixed and mobile services, communicating only within the United States and its insular areas, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies for fixed and mobile services, licensees shall be limited to the minimum power needed to achieve communications and shall take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU Radio Regulations.

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US368 The use of the bands 1390-1392 MHz and 1430-1432 MHz by the fixed-satellite service is limited to feeder links for the Non-Voice Non-Geostationary Mobile-Satellite Service and is contingent on (1) the completion of ITU-R studies on all identified compatibility issues as shown in Annex 1 of Resolution 745 (WRC-2003); (2) measurement of emissions from equipment that would be employed in operational systems and demonstrations to validate the studies as called for in Resolution 745 (WRC-2003); and (3) compliance with any technical and operational requirements that may be imposed at WRC-07 to protect other services in these bands and passive services in the band 1400-1427 MHz from unwanted emissions. Individual assignments shall be coordinated with the Interdepartment Radio Advisory Committee's (IRAC) Frequency Assignment Subcommittee (FAS) (see, for example, Recommendations ITU-R RA.769-1 and ITU-R SA.1029-1) to ensure the protection of passive services in the band 1400-1427 MHz. Coordination shall not be completed until the feeder uplink and downlink systems are tested and certified to be in conformance with the technical and operational requirements for the protection of passive services in the band 1400-1427 MHz. Certification and all supporting documentation shall be submitted to the Commission and the FAS prior to launch.

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USxxx Until 29 March 2009, the band 6765-7000 kHz is allocated to the fixed service on a primary basis and to the mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis.

USyyy The band 7300-7350 kHz is allocated, until April 1, 2007, to the fixed service on a primary basis and to the mobile service on a secondary basis. After April 1, 2007, frequencies in that band may be used by stations in the fixed and mobile services, communicating only within the United States and its insular areas, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies for fixed and mobile services, licensees shall be limited to the minimum power needed to achieve communications and shall take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU Radio Regulations.

USzzz In the band 432-438 MHz, the Earth exploration-satellite service (active) is allocated on a secondary basis for Federal Government use. Stations in the Earth exploration-satellite service (active) shall not be operated within line-of-sight of United States except for the purpose of short duration pre-operational testing. Operations under this allocation shall not cause harmful interference to, nor claim protection from, any other services allocated in the band 432-438 MHz in the United States, including secondary services and the amateur-satellite service.

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FEDERAL GOVERNMENT (G) FOOTNOTES

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Gxxx Use of the radionavigation-satellite service in the band 1215-1240 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under ITU Radio Regulation No. 5.331. Furthermore, the use of the radionavigation-satellite service in the band 1215-1240 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. ITU Radio Regulation No. 5.43 shall not apply in respect of the radiolocation service. ITU Resolution 608 (WRC-03) shall apply.

Gyyy No emissions to deep space shall be effected in the band 7190-7235 MHz. Geostationary satellites in the space research service operating in the band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply.

PART 25--SATELLITE COMMUNICATIONS

4. The authority citation for Part 25 continues to read as follows:

Authority: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303, 307, 309 and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

5. Section 25.208 is amended by adding new paragraph (p) to read as follows:

§ 25.208 Power flux density limits

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(p) The power flux-density at the Earth's surface produced by emissions from a space station in either the Earth exploration-satellite service in the band 25.5-27 GHz or the inter-satellite service in the band 25.25-27.5 GHz for all conditions and for all methods of modulation shall not exceed the following values:

- 115 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- 115 + 0.5(δ - 5) dB(W/m²) in any 1 MHz band for angles of arrival between 5 and 25 degrees above the horizontal plane;
- 105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

PART 73 -- RADIO BROADCAST SERVICES

6. The authority citation for Part 73 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303, 334 and 336.

7. Section 73.701 is amended by revising paragraph (e) to read as follows:

§ 73.701 Definitions.

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(e) Coordinated Universal Time (UTC). Time scale, based on the second (SI), as defined in Recommendation ITU-R TF.460-6.

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8. Section 73.220 is amended by removing and reserving paragraph (b).

§ 73.220 Restrictions on the use of channels.

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(b) [Reserved.]

9. Section 73.603 is amended by removing and reserving paragraph (b).

§ 73.603 Numerical designation of television channels.

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(b) [Reserved.]

10. Sections 73.702 is amended by revising paragraph (f)(2) and by adding new paragraphs (f)(3) and (f)(4) to read as follows:

§ 73.702 Assignment and use of frequencies.

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(f) Assigned frequencies shall be within the following bands, which are allocated on an exclusive basis to the broadcasting service:

(1) 5950-6200 kHz, 9500-9900 kHz, 11650-12050 kHz, 13600-13800 kHz, 15100-15600 kHz, 17550-17900 kHz, 21450-21850 kHz, and 25670-26100 kHz.

(2) Regional allocation. (i) Until March 29, 2009, the band 7100-7300 kHz is allocated on an exclusive basis to the broadcasting service in International Telecommunication Union (ITU) Regions 1 and 3 as defined in 47 C.F.R. § 2.104(b). Assignments in the band 7100-7300 kHz shall be limited to international broadcast stations located in ITU Region 3 insular areas (as defined in 47 C.F.R. § 2.105(a), note 4) that transmit to zones and areas of reception in ITU Region 1 or 3.

(ii) After March 29, 2009, the bands 7200-7300 kHz and 7400-7450 kHz are allocated on an exclusive basis to the broadcasting service in ITU Regions 1 and 3 and the band 7100-7200 kHz is not allocated to the broadcasting service. Assignments in the bands 7200-7300 kHz and 7400-7450 kHz shall be limited to international broadcast stations located in ITU Region 3 insular areas that transmit to zones and areas of reception in ITU Region 1 or 3.

(iii) During the hours of 0800-1600 UTC (Coordinated Universal Time) antenna gain with reference to an isotropic radiator in any easterly direction that would intersect any area in Region 2 shall not exceed

2.15 dBi, except in the case where a transmitter power of less than 100 kW is used. In this case, antenna gain on restricted azimuths shall not exceed that which is determined in accordance with equation below. Stations desiring to operate in this band must submit sufficient antenna performance information to ensure compliance with these restrictions. Permitted gain for transmitter powers less than 100 kW:

$$G_{\alpha} = 2.15 + 10 \log \left(\frac{100}{P_{\alpha}} \right) \text{ dBi}$$

Where:

G_i = maximum gain permitted with reference to an isotropic radiator.

P_a = Transmitter power employed in kW.

(3) Until April 1, 2007, frequencies within the following bands are assignable to the broadcasting service on a co-primary basis with the fixed service: 5900-5950 kHz, 7300-7350 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz, and 18900-19020 kHz (WARC-92 HFBC bands). In addition, the band 5900-5950 kHz is allocated to the land mobile service on a primary basis in Region 1 and to the mobile except aeronautical mobile (R) service on a primary basis in Region 2 until April 1, 2007. After April 1, 2007, the WARC-92 HFBC bands are assignable to the broadcasting service on an exclusive basis.

(4) Until March 29, 2009, frequencies within the band 7350-7400 MHz are assignable to the broadcasting service on a co-primary basis with the fixed service. After March 29, 2009, frequencies within the band 7350-7400 MHz are assignable to the broadcasting service on an exclusive basis.

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11. Section 73.751 is revised to read as follows:

§ 73.751 Operating power.

No international broadcast station shall be authorized to install, or be licensed for operation of, transmitter equipment with (a) a rated carrier power of less than 50 kilowatts (kW) if Double Sideband (DSB) modulation is used, (b) a peak envelope power of less than 50 kW if Single Sideband (SSB) modulation is used, or (c) an average power of less than 20 kW if digital modulation is used.

12. Section 73.756 is revised to read as follows:

§ 73.756 System specifications for double-sideband (DBS), single-sideband (SSB) and digitally modulated emissions in the HF broadcasting service.

(a) System specifications applicable to all international broadcast stations. (1) Carrier frequencies. Carrier frequencies shall be integral multiples of 5 kHz.

(2) Channel spacing. Channel spacing shall be 10 kHz. However, interleaved channels with a separation of 5 kHz may be used in accordance with the appropriate ITU protection criteria, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved. Additionally, in an all-inclusive SSB environment, the channel spacing shall be 5 kHz.

(3) Frequency tolerance. The frequency tolerance shall be 10 hertz.

(4) Maximum permitted spurious emission power levels. (i) Any emission appearing on a frequency removed from the carrier frequency by between 6.4 kHz and 10 kHz, inclusive, shall be attenuated at least 25 dB below the level of the unmodulated carrier. Compliance with the specification will be deemed to show the occupied bandwidth to be 10 kHz or less.

(ii) Any emission appearing on a frequency removed from the carrier frequency by more than 10 kHz and up to and including 25 kHz shall be attenuated at least 35 dB below the level of the unmodulated carrier.

(iii) Any emission appearing on a frequency removed from the carrier frequency by more than 25 kHz shall be attenuated at least 80 dB below the level of the unmodulated carrier.

(iv) In the event spurious emissions cause harmful interference to other stations or services, such additional steps as may be necessary to eliminate the interference must be taken immediately by the licensee.

(b) System specifications applicable to DSB and SSB systems. If audio-frequency signal processing is used, the dynamic range of the modulating signal shall be not less than 20 dB.

(c) System specifications applicable only to a DSB system. (1) The upper limit of the audio-frequency band (at -3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with lower frequencies attenuated at a slope of 6 dB per octave.

(2) The necessary bandwidth shall not exceed 9 kHz.

(d) System specifications applicable to only a SSB system. (1) Equivalent sideband power. When the carrier reduction relative to peak envelope power is 6 dB, an equivalent SSB emission is one giving the same audio-frequency signal-to-noise ratio at the receiver output as the corresponding DSB emission, when it is received by a DSB receiver with envelope detection. This is achieved when the sideband power of the SSB emission is 3 dB larger than the total sideband power of the DSB emission. (The peak envelope power of the equivalent SSB emission and the carrier power are the same as that of the DSB emission.)

(2) Emission characteristics. (i) Audio-frequency band. The upper limit of the audio-frequency band (at -3 dB) of the transmitter shall not exceed 4.5 kHz with a further slope of attenuation of 35 dB/kHz and the lower limit shall be 150 Hz with lower frequencies attenuated at a slope of 6 dB per octave.

(ii) Necessary bandwidth. The necessary bandwidth shall not exceed 4.5 kHz.

(iii) Carrier reduction (relative to peak envelope power). In a mixed DSB, SSB and digital environment, the carrier reduction shall be 6 dB to allow SSB emissions to be received by conventional DSB receivers with envelope detection without significant deterioration of the reception quality.

(iv) Sideband to be emitted. Only the upper sideband shall be used.

(v) Attenuation of the unwanted sideband. The attenuation of the unwanted sideband (lower sideband) and of intermodulation products in that part of the emission spectrum shall be at least 35 dB relative to the wanted sideband signal level. However, since there is in practice a large difference between signal amplitudes in adjacent channels, a greater attenuation is recommended.

(e) System specifications applicable to only a digital system. (1) Channel utilization. Channels using digitally modulated emissions may share the same spectrum or be interleaved with analog emissions in the same HFBC band, provided the protection afforded to the analog emissions is at least as great as that which is currently in force for analog-to-analog protection. Accomplishing this may require that the digital spectral power density (and total power) be lower by several dB than is currently used for either DSB or SSB emissions.

(2) Emission characteristics. (i) Bandwidth and center frequency. A full digitally modulated emission will have a 10 kHz bandwidth with its center frequency at any of the 5 kHz center frequency locations in the channel raster currently in use within the HFBC bands. Among several possible "simulcast" modes are those having a combination of analog and digital emissions of the same program in the same channel, that may use a digital emission of 5 kHz or 10 kHz bandwidth, next to either a 5 kHz or 10 kHz analog emission. In all cases of this type, the 5 kHz interleaved raster used in HFBC shall be adhered to in placing the emission within these bands.

(ii) Audio-frequency band. The quality of service, using digital source coding within a 10 kHz bandwidth, taking into account the need to adapt the emission coding for various levels of error avoidance, detection and correction, can range from the equivalent of monophonic FM (approximately

15 kHz) to the low-level performance of a speech codec (of the order of 3 kHz). The choice of audio quality is connected to the needs of the broadcaster and listener, and includes the consideration of such characteristics as the propagation conditions expected. There is no single specification, only the upper and lower bounds noted in this paragraph.

(iii) Modulation. Quadrature amplitude modulation (QAM) with orthogonal frequency division multiplexing (OFDM) shall be used. 64-QAM is feasible under many propagation conditions; others such as 32-, 16- and 8-QAM are specified for use when needed.

(iv) RF protection ratio values. The protection ratio values for analog and digital emissions for co-channel and adjacent channel conditions shall be in accordance with Resolution 543 (WRC-03) as provisional RF protection ratio values subject to revision or confirmation by a future competent conference.

13. Section 73.766 is removed and reserved.

§ 73.766 Modulation and bandwidth.

[Reserved.]

Appendix B: Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act (RFA),¹⁶⁹ the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this *Notice of Proposed Rule Making (Omnibus NPRM)*. Written public comments are requested on this IRFA and must be filed by the deadlines for comments on the *Omnibus NPRM* provided above in paragraph 111. The Commission will send a copy of the *Omnibus NPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.¹⁷⁰ In addition, the *Omnibus NPRM* (or summaries thereof), including the IRFA, will be published in the Federal Register.¹⁷¹

A. Need for, and Objectives of, the Proposed Rules

In the *Omnibus NPRM*, the Commission proposes to amend Parts 2, 25, and 73 of its Rules to complete the domestic implementation of allocation decisions from the World Radiocommunication Conference (Geneva, 2003) (WRC-03) concerning the frequency bands between 5900 kHz and 27.5 GHz and to otherwise update its Rules in this frequency range. In general, these changes would provide additional flexibility to Commission licensees. However, the proposals would in one case reallocate spectrum and in two cases add constraints.

First, the Commission proposes to reallocate the band 7350-7400 kHz from the fixed and mobile services to the broadcasting service, effective March 29, 2009. The Commission also proposes to cease issuing licenses for new stations in the fixed and mobile services as of March 29, 2009.

Second, the Commission proposes to change the allocation status of the fixed-satellite service in the bands 1390-1392 MHz and 1430-1432 MHz from primary to secondary in order to conform to the decisions made at WRC-03.

Third, the Commission proposes (1) to require that space stations and earth stations in the Earth exploration-satellite service (space-to-Earth) in the band 25.5-27 GHz be subject to case-by-case electromagnetic compatibility analysis in order to share this spectrum with Federal Government facilities; and (2) that these space stations specifically meet the international power flux-density limits for this band. In addition, the Commission requests comment on several constraints that may be helpful in fostering compatibility.

B. Legal Basis

This action is authorized under Sections 1, 4(i), 302, 303(f) and (r), 332, and 337 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 1, 4(i), 154(i), 302, 303(f) and (r), 332, 337.

C. Description and Estimate of the number of Small Entities to Which the Proposed Rule Will Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the proposed rules if adopted.¹⁷² The RFA generally

¹⁶⁹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 - 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

¹⁷⁰ 5 U.S.C. § 603(a).

¹⁷¹ *Id.*

¹⁷² 5 U.S.C. § 604(b)(3).

defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”¹⁷³ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.¹⁷⁴ A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).¹⁷⁵

A small organization is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹⁷⁶ Nationwide, as of 1992, there were approximately 275,801 small organizations.¹⁷⁷ “Small governmental jurisdiction” generally means “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000.”¹⁷⁸ As of 1997, there were approximately 87,453 governmental entities in the United States.¹⁷⁹ This number includes 39,044 county governments, municipalities, and townships, of which 37,546 (approximately 96.2%) have populations of fewer than 50,000 and 1,498 have populations of 500,000 or more. Thus, we estimate the number of small governmental jurisdictions overall to be approximately 84,098 or fewer.

The SBA has developed a small business size standard for Satellite Telecommunications, which consists of all such firms having \$12.5 million or less in annual receipts.¹⁸⁰ According to Census Bureau data for 1997, in this category there was a total of 324 firms that operated for the entire year.¹⁸¹ Of this total, 273 firms had annual receipts of under \$10 million, and an additional twenty-four firms had receipts of \$10 million to \$24,999,999.¹⁸² Thus, under this size standard, the majority of firms can be considered small.

Little LEO licensees operate non-geostationary mobile-satellite systems that provide non-voice services. There are currently two Little LEO licensees now in operation. Another Little LEO licensee has expressed interest in this band, but does not yet provide service. We believe that all Little LEO licensees are small businesses.

¹⁷³ 5 U.S.C. § 601(6).

¹⁷⁴ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

¹⁷⁵ 15 U.S.C. § 632.

¹⁷⁶ 5 U.S.C. § 601(4).

¹⁷⁷ Department of Commerce, U.S. Bureau of the Census, 1992 Economic Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

¹⁷⁸ 5 U.S.C. § 601(5).

¹⁷⁹ U.S. Census Bureau, Statistical Abstract of the United States: 2000, Section 9, pages 299-300, Tables 490 and 492.

¹⁸⁰ 13 C.F.R. § 121.201, NAICS code 517410 (changed from 513340 in October 2002).

¹⁸¹ U.S. Census Bureau, 1997 Economic Census, Subject Series: Information, “Establishment and Firm Size (Including Legal Form of Organization),” Table 4, NAICS code 513340 (issued October 2000).

¹⁸² *Id.*

Licensees in the Earth Exploration-Satellite Service (EESS) provide remote sensing services. While there are currently no EESS licensees in the band 25.5-27 GHz, two companies have expressed interest in using this band in the future. We believe that all EESS licensees are small businesses.

Wireless Service Providers. The SBA has developed a small business size standard for wireless small businesses in the category of **Cellular and Other Wireless Telecommunications**.¹⁸³ Under this SBA category, a wireless business is small if it has 1,500 or fewer employees. According to the Commission's most recent data,¹⁸⁴ 1,761 companies reported that they were engaged in the provision of wireless service. Of these 1,761 companies, an estimated 1,175 have 1,500 or fewer employees and 586 have more than 1,500 employees.¹⁸⁵ Consequently, the Commission estimates that most wireless service providers are small entities.

Licensees in the Fixed and Mobile Services in the band 7350-7400 kHz provide conventional Industrial/Business Pool services (44 licensees with 111 call signs), coastal group services (2 licensees, each with a single call sign), and Alaska group services (11 licensees with 18 call signs). We believe that some of the 44 licensees providing conventional Industrial/Business Pool services are small businesses; that both of the licensees providing coastal group services are small businesses; and that almost all of the licensees providing Alaska group services are small businesses.

We seek comment on this analysis. In providing such comment, commenters are requested to provide information regarding how many total and small business entities would be affected.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

EESS applicants would be required to do a technical analysis of the interference potential between their proposed operations and Federal Government operations, *i.e.*, an electromagnetic compatibility analysis. Engineering skills would be needed in order to perform the analysis. The power flux-density at the Earth's surface produced by emissions from an EESS space station would be limited in accordance with the ITU *Radio Regulations*.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.¹⁸⁶

The Commission proposes to reallocate the band 7350-7400 kHz from the fixed and mobile services to the broadcasting service, effective March 29, 2009. The Commission also proposes to cease

¹⁸³ 13 CFR § 121.201, North American Industry Classification System (NAICS) code 513322 (changed to 517212 in October 2002).

¹⁸⁴ FCC, Wireline Competition Bureau, Industry Analysis and Technology Division, Trends in Telephone Service, Table 5.3, (May 2002).

¹⁸⁵ *Id.*

¹⁸⁶ 5 U.S.C. § 603(c).

issuing licenses for new stations in the fixed and mobile services as of March 29, 2009. The phase-in of these rules would provide small businesses with a reasonable amount of time in which to relocate to other spectrum allocated to the fixed and mobile services, thus minimizing the impact of these proposed actions. In addition, the new broadcasting service allocation would provide new opportunities for international broadcasters that are small businesses.

The Commission had conditionally allocated the Little LEO feeder links on a primary basis, subject to the outcome of WRC-03. At WRC-03, the United States was unable to secure a primary allocation, but was able to garner conditional support for a worldwide secondary allocation for Little LEO feeder links. See paragraph 95. Based on this allocation, the Commission is proposing to adopt this secondary allocation, but requests comment on this proposal. Continued allocation for Little LEO feeder links in this band will provide opportunities for small businesses within the context of international agreements.

We seek comment on significant alternatives commenters believe we should adopt.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules

None.